

**American Electric Power Service
Corporation**

**Bottom Ash Storage Pond - CCR
Groundwater Monitoring Well
Network Evaluation**

J. Robert Welsh Power Plant
1187 County Road 4865
Titus County
Pittsburg, Texas

May 2, 2016



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Well Network Evaluation**

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Pittsburg, Texas

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AEP

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Acronyms and Abbreviation

AEP	American Electric Power Service Cooperation
amsl	above mean sea level
ARCADIS	ARCADIS U.S., Inc.
BAP	bottom ash pond
CCR	Coal Combustion Residual
CFR	Code of Federal Regulations
EPRI	Electric Power Research Institute
FAP	fly ash pond
FGD	flue gas desulfurization
ft	feet
TAC	Texas Administrative Code
TCEQ	Texas Commission on Environmental Quality
PTI	Permit to Install
TDS	total dissolved solids

1. Objective

This report was prepared by ARCADIS U.S., Inc. (ARCADIS) for American Electric Power Service Corporation (AEP) to assess the adequacy of the groundwater monitoring well network included in the Coal Combustion Residual (CCR) requirements, as specified in Code of Federal Regulations (CFR) 40 CFR 257.91, for the Bottom Ash Storage Pond (CCR Unit) at the AEP Generating Plant (Plant) located at 1187 County Road 4865 in Pittsburg, Titus County, Texas (**Figure 1**). The CCR requirements include an evaluation of the adequacy of the groundwater monitoring well network to characterize groundwater quality up and down gradient of the CCR unit.

Three regulated CCR units associated with the Plant were identified for review, which include the primary ash pond, landfill, and Bottom Ash Storage Pond (**Figure 2**). This report summarizes the evaluation of the groundwater monitoring well network in the uppermost aquifer at the Bottom Ash Storage Pond (Site).

This evaluation included a review of AEP-provided data associated with previously completed subsurface investigation activities in the vicinity of the Bottom Ash Storage Pond CCR unit, as well as publically-available geologic and hydrogeologic data. The following report also presents the current Conceptual Site Model based on all documents reviewed and will further describe the uppermost aquifer, include an evaluation of the adequacy of the existing monitoring well network, and provide recommendations for monitoring well augmentation, as necessary.

2. Background Information

The following section provides background information for the AEP J. Robert Welsh Generating Plant (Welsh Plant) Bottom Ash Storage Pond.

2.1 Facility Location Description

The AEP Welsh Plant is located in southern Titus County, approximately 8 miles northeast of Pittsburg, Texas, and approximately two miles northwest of Cason, Texas. The Bottom Ash Storage Pond CCR unit is located at the south end of the Plant and approximately 1,000 feet west of the Welsh Reservoir (**Figures 1 and 2**).

2.2 Description of Bottom Ash Storage Pond CCR Unit

The following section will discuss the embankment configuration, area, volume, construction and operational history, and surface water control associated with the Bottom Ash Storage Pond.

2.2.1 Embankment Configuration

The Bottom Ash Storage Pond was placed into operation in 2000, and is located in a topographically high area of the Plant. The Bottom Ash Storage Pond embankments are approximately 20 feet in height and are constructed of compacted clay on a 3:1 slope (3 feet horizontal, 1 foot vertical). The elevation at the base of the embankment is approximately 340 feet amsl, and the elevation at the top of the embankment around the perimeter of the Bottom Ash Storage Pond is approximately 360 feet amsl (Southwestern Electric Power Company, 2000).

2.2.2 Area/Volume

The Bottom Ash Storage Pond is 22 acres in size. Per the *Hydraulic Analysis of Welsh Power Plant Ash Ponds Report*, dated December 2010 (Freese and Nichols, 2010), the principal spillway for the Bottom Ash Storage Pond is located near the southeast corner of the pond and consists primarily of an 18 inch drain at elevation 350.5 feet amsl and also of a 40-foot-long broad-crested weir with a crest elevation of 355 feet amsl. The emergency spillway is an 8-foot-wide weir with a rock rip-rap discharge chute located along the southern embankment at an elevation of 358 feet amsl. The storage capacity of the Bottom Ash Storage Pond at elevation 358 feet amsl is 86.50 acre-ft (Freese and Nichols, 2010).

2.2.3 Construction and Operational History

The AEP J. Robert Welsh Plant began operations in approximately 1977 with three coal-fired generating units (Units 1, 2, and 3). Throughout the life of the generating plant, CCR materials (fly ash, bottom ash, economizer ash) have been generated. All of these byproducts were stored in the primary ash pond and in the adjacent landfill that was constructed in the late 1970's. In 2000, the 22-acre Bottom Ash Storage Pond was installed south of the landfill. The Bottom Ash Storage Pond was constructed with a 60-mil high-density polyethylene (HDPE) liner, and receives bottom ash and economizer ash dredged and sluiced from the primary ash pond (**Figure 2**).

The Bottom Ash Storage Pond 60-mil HDPE liner is located at the base of the Bottom Ash Storage Pond at an elevation of 340 feet amsl. The liner also extends along the base of the Bottom Ash Storage Pond sidewalls and is keyed into the top of the Bottom Ash Storage Pond earthen embankment at an elevation of 360 feet amsl (Southwestern Electric Power Company, 2000).

The southeast corner of the Bottom Ash Storage Pond contains an approximate ¼-acre clear water pond with a base elevation of 347 feet amsl (**Figure 3**). The clear water pond receives clear water primarily through an 18 inch drain and then through an overflow structure from the main part of the Bottom Ash Storage Pond through the 40-foot-long broad-crested weir discussed above in Section 2.2.2. Water in the ¼-acre clear water pond at the southeast corner of the Bottom Ash Storage Pond discharges through a 30-inch-diameter pipe into the primary ash pond system.

2.2.4 Surface Water Control

Surface water flow within the Bottom Ash Storage Pond is primarily controlled by an 18 inch drain and then by a weir located on the southeast side of the pond below the embankments. The pond elevation is maintained so that surface water flows through the drain pipe at invert elevation 350.5 amsl or weir which has a crest elevation of 355 feet amsl. Clear water flows through the weir into the ¼-acre clear water pond at the southeast corner of the Bottom Ash Storage Pond, then discharges through a 30-inch-diameter pipe into the primary ash pond (**Figure 3**).

The emergency spillway for the Bottom Ash Storage Pond is located along the southern embankment, and is 8 feet wide with a crest elevation of 358 feet amsl. The perimeter embankments of the Bottom Ash Storage Pond are located at an elevation of 360 feet amsl. Therefore the perimeter embankments have approximately five feet of

freeboard above the clear water discharge weir, and approximately two feet of freeboard above the emergency spillway.

2.3 Previous Investigations

The initial soils investigation for the site was provided in a 1973 report prepared by McClelland Engineers, Inc. entitled "*Soils Investigation, Welsh Power Plant, Cason, Texas*". This investigation included advancement of soil borings in the primary ash pond area, and geotechnical soil testing to characterize the area encompassed by the primary ash pond.

In 2000, Maxim Technologies prepared a report entitled "*Subsurface Exploration for Ash Storage Area, Phase II, Welsh Power Plant, Cason, Texas*". This report evaluated the geotechnical properties of the soils below the Bottom Ash Storage Pond.

In 2000, an HDPE liner installation report was prepared by Alliance Incorporated. This report provided details regarding installation of the 60-mil HDPE liner on the bottom of the Bottom Ash Storage Pond.

In 2001, five monitoring wells (AD-1 through AD-5) were installed in the area of the primary ash pond and Bottom Ash Storage Pond to obtain hydrologic data for the uppermost water-bearing unit. Twelve additional monitoring wells (AD-4a, AD-4b, AD-4c, AD-6 through AD-14) were installed in the area of the primary ash pond, Bottom Ash Storage Pond, and landfill by Eagle Environmental Services in 2009 to obtain more detailed hydrologic data for the uppermost water-bearing unit.

In 2010, Freese and Nichols performed a *Hydraulic Analysis of the Welsh Power Plant Ash Ponds* (Freese and Nichols, 2010). The report concluded the spillways for the primary ash pond, clear water pond, and Bottom Ash Storage Pond are hydraulically adequate for the full range of storm events from the 10-year to the 100-year storm events.

In December 2015, Auckland Consulting further expanded the groundwater monitoring well system at the Plant by installation of monitoring wells AD-15 through AD-18 (Auckland Consulting, 2016). Monitoring well completion diagrams are provided in **Appendix A**.

2.4 Hydrogeologic Setting

The site area is located within the West Gulf Coastal Plain. Cretaceous formations crop out in belts that extend in a northeasterly direction parallel to the Gulf of Mexico, and dip gently southeast. The Site is located on the outcrop of the Eocene-age Recklaw Formation, which consists of very fine to fine grained sand and clay (Flawn, 1966).

These features are further illustrated on five lines of cross section that were prepared through the Bottom Ash Storage Pond area, with three lines trending from west to east (A-A'; B-B'; C-C'), and the other two lines trending from north to south (D-D'; E-E'). The cross section location map is included as **Figure 3** and the lines of cross section are included as **Figure 4** (A-A') through **Figure 8** (E-E').

2.4.1 Climate and Water Budget

The climate of Titus County, Texas is moist subhumid. The normal January temperature is 45°Fahrenheit (F), and the normal July temperature is 82.9°F. The mean annual growing season is 228 days (Broom, 1965). Average annual precipitation (including liquid water equivalent from snowfall) is approximately 47 inches according to weatherdb.com.

2.4.2 Regional and Local Geologic Setting

The Site is located on the outcrop of the Eocene-age Recklaw Formation, which consists of very fine to fine grained sand and clay (Flawn, 1966). The Recklaw Formation attains a thickness of approximately 110 feet in Titus County, and is underlain by the Eocene-age Carrizo Sand which consists of fine to coarse sand, silt, and clay (Broom, 1965). In the topographically low areas underling the Welsh Reservoir to the east of the Bottom Ash Storage Pond, Quarternary alluvial sediments associated with Swauano Creek are present (Flawn, 1966).

Detailed regional geologic characterization can be found in several published reports including Texas Water Commission Bulletin 6517 "*Ground-Water Resources of Camp, Franklin, Morris and Titus Counties, Texas*" (Broom, 1965), and The University of Texas at Austin Bureau of Economic Geology "*Geologic Atlas of Texas – Texarkana Sheet*" (Flawn, 1966).

Detailed regional and site geologic characterization can be found in the 2010 E TTL report entitled "*Geotechnical Investigation, Welsh Power Station, Existing Ash Storage Ponds Embankment Investigation, Pittsburg, Texas*" (E TTL, 2010).

2.4.3 Surface Water and Surface Water Groundwater Interactions

The Site is generally less than one-half mile from Swauano Creek, which was dammed near the southern end of the Site during plant development to form the Welsh Reservoir. Groundwater flow direction at the Site is generally from west to east, following surface topography towards the Welsh Reservoir. The Welsh Reservoir is likely a gaining surface water feature, and groundwater elevations on site are higher than the normal stage elevation of the Welsh Reservoir (approximately 320 feet amsl).

The Bottom Ash Storage Pond normal operating level is near the clear water overflow weir which has a crest elevation of 355 feet amsl. **Figure 9** is a potentiometric surface map based on March 2016 water level data for the uppermost aquifer at the Site, and water level elevations in the Site monitoring wells are summarized on **Table 1**. As shown on **Figure 9**, shallow groundwater flow direction in the area of the Bottom Ash Storage Pond is east-southeasterly toward the Welsh Reservoir at an average hydraulic gradient of approximately 0.01 foot per foot.

2.4.4 Water Users

A water well inventory conducted by Banks Information Solutions showed one water well within a ½-mile radius of the Site (Banks, 2013). The water well is located on-site to the southwest (sidegradient) of the primary ash pond, and was installed for Southwestern Electric Company in 1974 with screens from 515 to 535 feet below ground surface, and plugged at a later date.

3. Groundwater Monitoring Well Network Evaluation

The existing monitoring well network present at the Site was evaluated to determine if any of the wells were viable for continued use as part of the groundwater monitoring well network or also retained as part of a larger groundwater hydraulic monitoring well network. The hydrogeologic conditions were also evaluated to determine if the uppermost aquifer unit has an effective well network. The evaluation was completed in accordance with 40 CFR 257.91 to have an established monitoring well network that effectively monitors the uppermost aquifer up gradient and down gradient of the Site. The up gradient wells represent background groundwater quality and the down gradient wells are to be placed down gradient of the CCR unit boundary to monitor water quality.

3.1 Hydrostratigraphic Units

3.1.1 Horizontal and Vertical Position Relative to CCR Unit

Geologic data from soil borings and monitoring wells installed at the site show the uppermost aquifer in the area of the Bottom Ash Storage Pond is a very fine to fine grained silty sand and sandy silt stratum with an average thickness of approximately 12 feet that is located between an elevation of approximately 320 and 332 feet amsl (**Appendix A**). The base of the Bottom Ash Storage Pond is at an elevation of 340 feet amsl. Therefore the separation distance between the uppermost aquifer and the base of the Bottom Ash Storage Pond is approximately 8 feet. This separation distance is further illustrated on cross section C-C' (**Figure 6**) and cross section D-D' (**Figure 7**).

3.1.2 Overall Flow Conditions

Groundwater is recharged from regional precipitation infiltration. The uppermost aquifer (silty sand) is expected to have a hydraulic conductivity of approximately 10^{-4} centimeters per second (Fetter, 1980). Based on the hydraulic conductivity and saturated thickness (approximately 12 feet), the yield of the uppermost aquifer is anticipated to exceed the TCEQ non-useable (Class 3) limit of 150 gallons per day (TCEQ, 2010).

Available groundwater elevations are summarized on **Table 1** for 2011 through 2016. The most recent comprehensive groundwater data set is depicted on **Figure 9**. The groundwater flow is generally easterly towards the Welsh Reservoir.

3.2 Uppermost Aquifer

3.2.1 CCR Rule Definition

The CCR rule definitions for an aquifer and the uppermost aquifer as specified in 40 CFR 257.53 indicates an aquifer is a geologic formation capable of yielding usable quantities of groundwater to wells or springs while an uppermost aquifer is defined as the geologic formation nearest the natural ground surface that is an aquifer, as well as lower aquifers, that are hydraulically interconnected with this aquifer within the facility's property boundary. Upper limit is measured at a point nearest to the natural groundwater surface to which the aquifer rises during the wet season.

3.2.1.1 Common Definitions

An aquifer is commonly defined as a geologic unit that stores and transmits water (readily or at sufficient flow rates) to supply wells and springs (USGS, 2015; Fetter, 2001). The uppermost aquifer is considered the first encountered aquifer nearest to the CCR unit.

3.2.2 Identified Onsite Hydrostratigraphic Unit

The identified on-Site hydrostratigraphic unit in the area of the Bottom Ash Storage Pond is the very fine to fine grained silty sand and sandy silt stratum that is located between an elevation of approximately 320 and 332 feet amsl. This unit is not used locally for groundwater supply or industrial water use, but meets the TCEQ definition of a useable aquifer.

3.3 Review of Existing Monitoring Well Network

3.3.1 Overview

The Site was visited by ARCADIS and AEP personnel on August 20, 2015 to review existing well network conditions and locations. A well construction table that summarizes the location, ground surface elevation, borehole depth, installation date, and associated well construction details of the monitoring well network is included as **Table 2**. Photo documentation of the located wells during the August 20, 2015 site visit is provided in **Appendix B**.

Monitoring wells AD-1 through AD-4, AD-4a, AD-4b, and AD-4c were previously installed at the Site to monitor the uppermost aquifer (very fine to fine grained silty sand and sandy silt stratum) associated with the Bottom Ash Storage Pond. As discussed above in Section 3.1.1, the aquifer below the Bottom Ash Storage Pond is approximately 12 feet thick and is located between an elevation of approximately 320 and 332 feet amsl.

3.3.2 Gaps in Monitoring Network

As shown on Geologic Cross Sections A-A' (**Figure 4**) and C-C' (**Figure 6**), existing monitoring wells AD-5 and AD-1 are screened at the top of the uppermost aquifer up gradient (northwest) of the Bottom Ash Storage Pond, and existing monitoring wells AD-4a, AD-4b, and AD-4c are screened in the uppermost aquifer down gradient (east) of the Bottom Ash Storage Pond. Existing monitoring wells AD-1 and AD-5 will be utilized as the up gradient monitoring wells for the Bottom Ash Storage Pond. Monitoring wells AD-17 and AD-18, installed northwest (up gradient) of the Bottom Ash Storage Pond during December 2015, will also be utilized as up gradient monitoring wells for the Bottom Ash Storage Pond.

Existing monitoring well AD-3, located east of the Bottom Ash Storage Pond, will be utilized as a down gradient monitoring well for the Bottom Ash Storage Pond. Existing monitoring wells AD-4, AD-4a, AD-4b, and AD-4c are located in close proximity to each other, and as shown on **Figure 9**, monitoring well AD-4c is the furthest down gradient of these four monitoring wells. Therefore monitoring well AD-4c will be utilized as a down gradient monitoring well for the Bottom Ash Storage Pond.

As shown on **Figure 9**, existing monitoring well AD-14 is located east of the northeast corner of the Bottom Ash Storage Pond. However, due to the close proximity of the landfill CCR unit directly north of the Bottom Ash Storage Pond, groundwater at monitoring well AD-14 could be affected by the landfill. Therefore monitoring well AD-14 will not be utilized as part of the groundwater monitoring system for the Bottom Ash Storage Pond. This data gap was addressed by installation of new monitoring well AD-16 during December 2015 east (down gradient) of the Bottom Ash Storage Pond as shown on **Figure 9** and **Figure 10**. With the addition of monitoring wells AD-16, AD-17, and AD-18 during December 2015, there are no gaps remaining in the groundwater monitoring network for the Bottom Ash Storage Pond.

4. Recommended Monitoring Network and PE Certification

The recommended existing groundwater monitoring well network is intended to meet specifications stated in 40 CFR 257.91. Recommended wells are further discussed with respect to location to the Bottom Ash Storage Pond (up gradient or down gradient), well depth, and well construction. The recommended network would provide an improved understanding of groundwater quality, hydraulics, and groundwater flow at the Bottom Ash Storage Pond.

4.1 Recommended Monitoring Well Network Distribution

Four up gradient well locations (existing monitoring wells AD-1, AD-5, AD-17, and AD-18) and three down gradient well locations (existing monitoring wells AD-3, AD-4c, and AD-16) are recommended to establish a groundwater quality monitoring well network for the Bottom Ash Storage Pond. In addition, existing monitoring wells AD-2, AD-4, AD-4a, and AD-4b may be utilized as piezometers to obtain additional groundwater flow direction and gradient data for the Bottom Ash Storage Pond.

4.1.1 Location

The recommended monitoring well network for groundwater quality of the uppermost aquifer at the Bottom Ash Storage Pond is summarized on **Table 3** and illustrated on **Figure 10**.

4.1.2 Depth

The screen depths for the monitoring wells recommended for inclusion in the monitoring network are within the shallow saturated sand stratum (uppermost aquifer) that occurs between an elevation of approximately 320 and 332 feet amsl as shown on Geologic Cross Sections C-C' (**Figure 6**) and D-D' (**Figure 7**). The screen elevations are presented in **Table 3**.

4.1.3 Well Construction

As discussed above in Section 3.3.2, the gap in the monitoring well network for the uppermost aquifer at the Bottom Ash Storage Pond was addressed by installation of monitoring wells AD-16, AD-17, and AD-18 during December 2015. Monitoring wells AD-16, AD-17, and AD-18 were installed by a Texas Department of Licensing and Regulation (TDLR)-licensed water well driller. Well construction data for the monitoring

well network are summarized on **Tables 2** and **3**, and the monitoring well completion diagrams are provided in **Appendix A**.

4.2 Professional Engineer's Certification

I, Kenneth J. Brandner, certify that this report was prepared under my direction and supervision, and that the information contained herein is true and accurate to the best of my knowledge. Based on my experience and knowledge of the site, the proposed groundwater monitoring system will be adequate to meet the requirements of 40 CFR Part 257.91.

Kenneth J. Brandner

Printed Name of Registered Professional Engineer

Kenneth J. Brandner

Signature



69586

Registration No.

Texas

Registration State

5-2-16

Date

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Tables



Table 1
Water Level Data
AEP J. Robert Welsh Power Plant - CCR Storage Areas
Pittsburg, Titus County, Texas

Well ID	Latitude	Longitude	Ground Surface Elevation	Top of Casing Elevation	Borehole depth ft. bis	Date Installed	Screen Material	Well diameter inches	Top of Screen Depth ft. bis	Elevation ft. msl	Bottom of Screen Depth ft. bis	Elevation ft. msl	6/7/2011 GW Elev. ft. msl	12/6/2011 GW Elev. ft. msl	5/2/2012 GW Elev. ft. msl	11/1/2012 GW Elev. ft. msl	5/14/2013 GW Elev. ft. msl	11/16/2013 GW Elev. ft. msl	5/12/2014 GW Elev. ft. msl	11/16/2014 GW Elev. ft. msl	5/12/2015 GW Elev. ft. msl	3/4/2016 GW Elev. ft. msl	
AD-1 (a)	33° 02' 48"	94° 50' 47"	355.57	357.57	25.0	1/11/01	Sch. 40 PVC	2	15.0	340.57	25.0	330.57	338.46	334.92	337.88	337.18	337.43	336.73	338.03	337.64	340.62	342.83	
AD-2 (a)	33° 02' 37"	94° 50' 44"	344.16	346.16	25.0	4/26/01	Sch. 40 PVC	2	15.0	329.16	25.0	319.16	330.16	329.07	330.00	329.26	329.83	329.70	330.09	329.69	332.56	332.32	
AD-3 (a)	33° 02' 36"	94° 50' 37"	331.10	333.10	17.0	4/26/01	Sch. 40 PVC	2	7.0	324.10	17.0	314.10	323.81	323.19	323.99	323.29	323.77	323.98	324.12	325.13	325.58	325.12	
AD-4a (a)	33° 02' 43"	94° 50' 33"	340.61	342.61	30.0	4/26/01	Sch. 40 PVC	2	19.0	321.61	29.0	311.61	324.81	324.84	324.62	324.40	324.74	325.52	325.44	325.34	327.00	326.90	
AD-4b (a)	33° 04' 53"	94° 84' 25.8	340.19	342.65	30.0	9/22/09	Sch. 40 PVC	2	5.0	320.19	30.0	310.19	325.01	324.19	325.24	322.90	324.86	324.68	325.64	325.34	327.19	327.12	
AD-4c (a)	33° 04' 50"	94° 84' 23.0	329.55	333.23	15.0	9/23/09	Sch. 40 PVC	2	5.0	324.55	15.0	314.55	324.35	324.32	324.50	324.30	324.30	325.21	325.22	324.90	326.58	326.67	
AD-5 (a)	33° 03' 13"	94° 84' 24.4	329.15	333.28	15.0	9/23/09	Sch. 40 PVC	2	5.0	324.15	15.0	314.15	324.18	324.50	324.64	324.37	324.11	325.06	325.01	324.71	326.50	326.19	
AD-6 (a)	33° 05' 23.5	94° 84' 7.57	343.31	346.33	33.0	1/11/01	Sch. 40 PVC	2	20.0	329.00	30.0	319.00	336.34	336.58	336.82	336.99	336.78	336.47	336.80	336.01	339.07	338.04	
AD-7 (a)	33° 05' 25.7	94° 84' 7.57	343.31	346.33	33.0	9/23/09	Sch. 40 PVC	2	20.0	329.00	30.0	319.00	336.34	336.58	336.82	336.99	336.78	336.47	336.80	336.01	339.07	338.04	
AD-8 (a)	33° 05' 18.7	94° 84' 02.6	337.53	340.01	29.0	9/21/09	Sch. 40 PVC	2	16.0	321.53	26.0	311.53	325.41	324.09	325.69	325.15	325.79	325.75	325.98	325.77	326.05	325.70	
AD-9 (a)	33° 04' 59.5	94° 84' 19.6	340.09	343.09	35.0	9/21/09	Sch. 40 PVC	2	20.0	320.32	35.0	305.32	328.46	328.53	328.63	328.44	328.74	329.38	329.76	329.88	329.98	329.74	
AD-10 (a)	33° 04' 58.1	94° 84' 04.7	340.23	343.01	35.0	9/21/09	Sch. 40 PVC	2	20.0	320.23	35.0	305.23	328.44	328.53	328.63	328.44	328.74	329.38	329.76	329.88	329.98	329.74	
AD-11 (a)	33° 04' 58.1	94° 84' 17.7	338.61	342.18	20.0	9/22/09	Sch. 40 PVC	2	10.0	329.61	20.0	319.61	327.99	328.37	327.82	327.93	327.94	328.13	328.20	327.97	328.96	328.55	
AD-12 (a)	33° 04' 50.1	94° 84' 17.7	338.61	342.18	20.0	9/22/09	Sch. 40 PVC	2	10.0	329.61	20.0	319.61	327.99	328.37	327.82	327.93	327.94	328.13	328.20	327.97	328.96	328.55	
AD-13 (a)	33° 04' 51.8	94° 84' 27.5	344.12	347.00	30.0	9/22/09	Sch. 40 PVC	2	20.0	346.27	30.0	336.27	348.30	348.29	349.86	349.86	349.86	349.86	349.86	349.86	350.01	350.39	
AD-14 (a)	33° 03' 04.4"	94° 50' 27"	340.21	343.29	19.0	9/22/09	Sch. 40 PVC	2	6.0	338.12	16.0	328.12	332.36	332.24	333.09	332.26	332.68	333.25	333.35	333.01	337.58	334.76	
AD-15 (a)	33° 02' 49"	94° 50' 29"	350.86	353.97	21.0	12/10/15	Sch. 40 PVC	2	25.5	314.71	45.5	294.71	330.40	329.80	331.67	330.34	330.94	331.69	332.12	330.17	336.63	334.83	
AD-16 (a)	33° 02' 57"	94° 51' 06"	353.99	357.10	40.0	12/10/15	Sch. 40 PVC	2	11.0	339.86	21.0	329.86	---	---	---	---	---	---	---	---	---	322.14	
AD-18 (a)	33° 03' 03.3"	94° 51' 03.3"	346.17	349.28	29.0	12/11/15	Sch. 40 PVC	2	14.0	332.17	29.0	317.17	---	---	---	---	---	---	---	---	---	337.09	
AD-19 (a)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	334.64
AD-20 (a)	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	---	343.86
B-2 (a)	33° 03' 07.8"	94° 50' 44.9"	339.7	339.7	50.0	10/28/09	Sch. 40 PVC	2	10.0	329.70	20.0	319.70	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-4 (a)	33° 03' 01.1"	94° 50' 46.2"	340.6	340.6	50.0	10/27/09	Sch. 40 PVC	2	8.0	332.60	18.0	322.60	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-5 (a)	33° 02' 86.4"	94° 50' 42.8"	340.0	340.0	50.0	10/27/09	Sch. 40 PVC	2	8.0	330.00	20.0	320.00	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM
B-8 (a)	33° 02' 91.2"	94° 50' 46.2"	340.1	340.1	50.0	10/28/09	Sch. 40 PVC	2	12.0	328.10	22.0	318.10	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM	NM

NM - Not measured.

(a) Source: Eagle Environmental Services Well Logs (2009).

(b) Source: EITL Engineers & Consultants Inc. (June 21, 2010).

(c) Source: Southwest Electric Power, State of Texas Well Report (2001).

(d) Source: Auckland Consulting LLC (January 26, 2016). Monitoring wells AD-15 through AD-18 installed during December 2015.

Groundwater Elevation Source: AEP, Shallow Groundwater Data Summary through March 2016.

Table 2
Well Construction Details
AEP J. Robert Welsh Power Plant - CCR Units
Pittsburg, Titus County, Texas

Well ID	Latitude	Longitude	Ground Surface Elevation	Borehole depth ft. bis	Date Installed	Screen Material	Well diameter inches	Top of Filter Pack		Bottom of Filter Pack		Top of Screen		Bottom of Screen	
								Depth ft. bis	Elevation ft. msl	Depth ft. bis	Elevation ft. msl	Depth ft. bis	Elevation ft. msl	Depth ft. bis	Elevation ft. msl
Monitoring Wells															
AD-1 (c)	33° 02' 48"	94° 50' 47"	355.57	25.0	1/11/2001	PVC	2	13	343	25	331	15.0	340.57	25.0	330.57
AD-2 (c)	33° 02' 37"	94° 50' 44"	344.16	25.0	4/26/2001	PVC	2	12	332	25	319	15.0	329.16	25.0	319.16
AD-3 (c)	33° 02' 38"	94° 50' 37"	331.10	17.0	4/26/2001	PVC	2	5	326	17	314	7.0	324.10	17.0	314.10
AD-4 (c)	33° 02' 43"	94° 50' 33"	340.61	30.0	4/26/2001	PVC	2	16	325	30	311	19.0	321.61	29.0	311.61
AD-4a (e)	33.04527	94.84258	340.19	30.0	9/22/2009	PVC	2	17	323	30	310	20.0	320.19	30.0	310.19
AD-4b (e)	33.04531	94.84230	329.55	15.0	9/23/2009	PVC	2	4	326	15	315	5.0	324.55	15.0	314.55
AD-4c (e)	33.04507	94.84244	329.15	15.0	9/23/2009	PVC	2	4	325	15	314	5.0	324.15	15.0	314.15
AD-5 (c)	33° 03' 13"	94° 51' 00"	349.00	30.0	1/11/2001	PVC	2	16	333	30	319	20.0	329.00	30.0	319.00
AD-6 (e)	33.05235	94.84757	343.31	33.0	9/23/2009	PVC	2	21	322	33	310	23.0	320.31	33.0	310.31
AD-7 (e)	33.05257	94.84219	347.86	38.0	9/24/2009	PVC	2	26	322	38	310	28.0	319.86	38.0	309.86
AD-8 (e)	33.05187	94.84026	337.53	29.0	9/21/2009	PVC	2	14	324	29	309	16.0	321.53	26.0	311.53
AD-9 (e)	33.04995	94.84196	340.32	35.0	9/22/2009	PVC	2	18	322	35	305	20.0	320.32	35.0	305.32
AD-10 (e)	33.04881	94.84047	340.23	35.0	9/22/2009	PVC	2	18	322	35	305	20.0	320.23	35.0	305.23
AD-11 (e)	33.04824	94.84177	339.61	20.0	9/22/2009	PVC	2	8	332	20	320	10.0	329.61	20.0	319.61
AD-12 (e)	33.04901	94.84977	366.27	30.0	9/24/2009	PVC	2	18	348	30	336	20.0	346.27	30.0	336.27
AD-13 (e)	33.04918	94.84275	344.12	20.0	9/22/2009	PVC	2	4	340	20	324	6.0	338.12	16.0	328.12
AD-14 (e)	33.04715	94.84256	342.32	19.0	9/22/2009	PVC	2	6	336	18	324	8.0	334.32	18.0	324.32
AD-15 (d)	33° 03' 04"	94° 50' 27"	340.21	46.0	12/12/15	PVC	2	22	318	45.5	295	25.5	314.71	45.5	294.71
AD-16 (d)	33° 02' 49"	94° 50' 29"	350.86	21.0	12/10/15	PVC	2	9	342	21	330	11.0	339.86	21.0	329.86
AD-17 (d)	33° 02' 57"	94° 51' 06"	353.99	40.0	12/10/15	PVC	2	22	332	39	315	24.0	329.99	39.0	314.99
AD-18 (e)	33° 03' 03"	94° 51' 03"	346.17	29.0	12/11/15	PVC	2	12	334	29	317	14.0	332.17	29.0	317.17
Piezometers															
B-2 (b)	33° 03.078'	94° 50.449'	339.7	50.0	10/28/2009	PVC	2	8	332	20	320	10.0	329.70	20.0	319.70
B-4 (b)	33° 03.011'	94° 50.462'	340.6	50.0	10/27/2009	PVC	2	8	333	18	323	8.0	332.60	18.0	322.60
B-5 (b)	33° 02.964'	94° 50.428'	340.0	50.0	10/27/2009	PVC	2	5	335	20	320	10.0	330.00	20.0	320.00
B-6 (b)	33° 02.912'	94° 50.462'	340.1	50.0	10/28/2009	PVC	2	4	336	22	318	12.0	328.10	22.0	318.10

General Notes:
Elevation in feet above mean sea level.

Footnotes:

- (a) Source: Eagle Environmental Services Well Logs (2009).
- (b) Source: ETL Engineers & Consultants Inc. (June 21, 2010).
- (c) Source: Southwest Electric Power, State of Texas Well Report (2001).
- (d) Source: Auckland Consulting LLC (January 26, 2016). Monitoring wells AD-15 through AD-18 installed during December 2015.

Acronyms and Abbreviations:

NA = Data not available
ft = feet
bis = below land surface
msl = mean sea level

Table 3
Proposed Well Network
AEP J. Robert Welsh Power Plant - Bottom Ash Storage Pond
Pittsburg, Titus County, Texas

Well ID	Existing/ Proposed	Hydrostratigraphic Unit Target	Location Description	Screen Top Elevation (ft amsl)	Screen Bottom Elevation (ft amsl)	Screen Length (ft)	Comments
Upgradient							
AD-1	Existing	Uppermost Water-Bearing Unit	West of Bottom Ash Storage Pond	340.6	330.6	10	Existing well installed in 2001; well will be utilized to establish background water quality
AD-5	Existing	Uppermost Water-Bearing Unit	NW of Bottom Ash Storage Pond	329.0	319.0	10	Existing well installed in 2001; well will be utilized to establish background water quality
AD-17	Existing	Uppermost Water-Bearing Unit	NW of Bottom Ash Storage Pond	330.0	315.0	15	New monitoring well installed during December 2015 in uppermost shallow aquifer northwest of Bottom Ash Storage Pond - upgradient; well will be utilized to establish background water quality
AD-18	Existing	Uppermost Water-Bearing Unit	NW of Bottom Ash Storage Pond	332.2	317.2	15	New monitoring well installed during December 2015 in uppermost shallow aquifer northwest of Bottom Ash Storage Pond - upgradient; well will be utilized to establish background water quality
Downgradient							
AD-3	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	324.1	314.1	10	Existing well installed in 2001; uppermost shallow aquifer adjacent to the bottom ash storage pond - downgradient
AD-4c	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	324.2	314.2	10	Existing well installed in 2009; uppermost shallow aquifer adjacent to the bottom ash storage pond - downgradient
AD-16	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	339.9	329.9	10	New monitoring well installed during December 2015 in uppermost shallow aquifer adjacent to the bottom ash storage pond - downgradient
Piezometers							
AD-2	Existing	Uppermost Water-Bearing Unit	South of Bottom Ash Storage Pond	329.2	319.2	10	Existing well installed in 2001; and utilized to obtain water level data for uppermost water-bearing unit
AD-4	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	321.6	311.6	10	Existing well installed in 2001; and utilized to obtain water level data for uppermost water-bearing unit
AD-4a	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	320.2	310.2	10	Existing well installed in 2009; and utilized to obtain water level data for uppermost water-bearing unit
AD-4b	Existing	Uppermost Water-Bearing Unit	East of Bottom Ash Storage Pond	324.6	314.6	10	Existing well installed in 2009; and utilized to obtain water level data for uppermost water-bearing unit

Acronyms and Abbreviations:

U=Upgradient

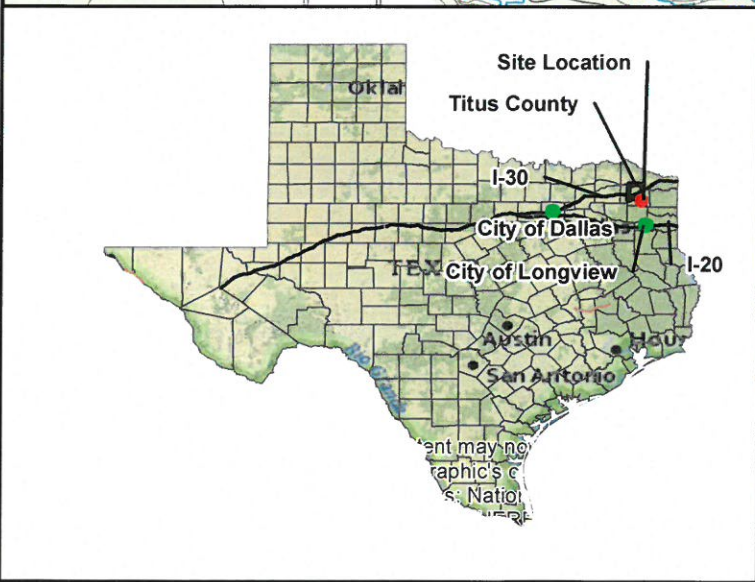
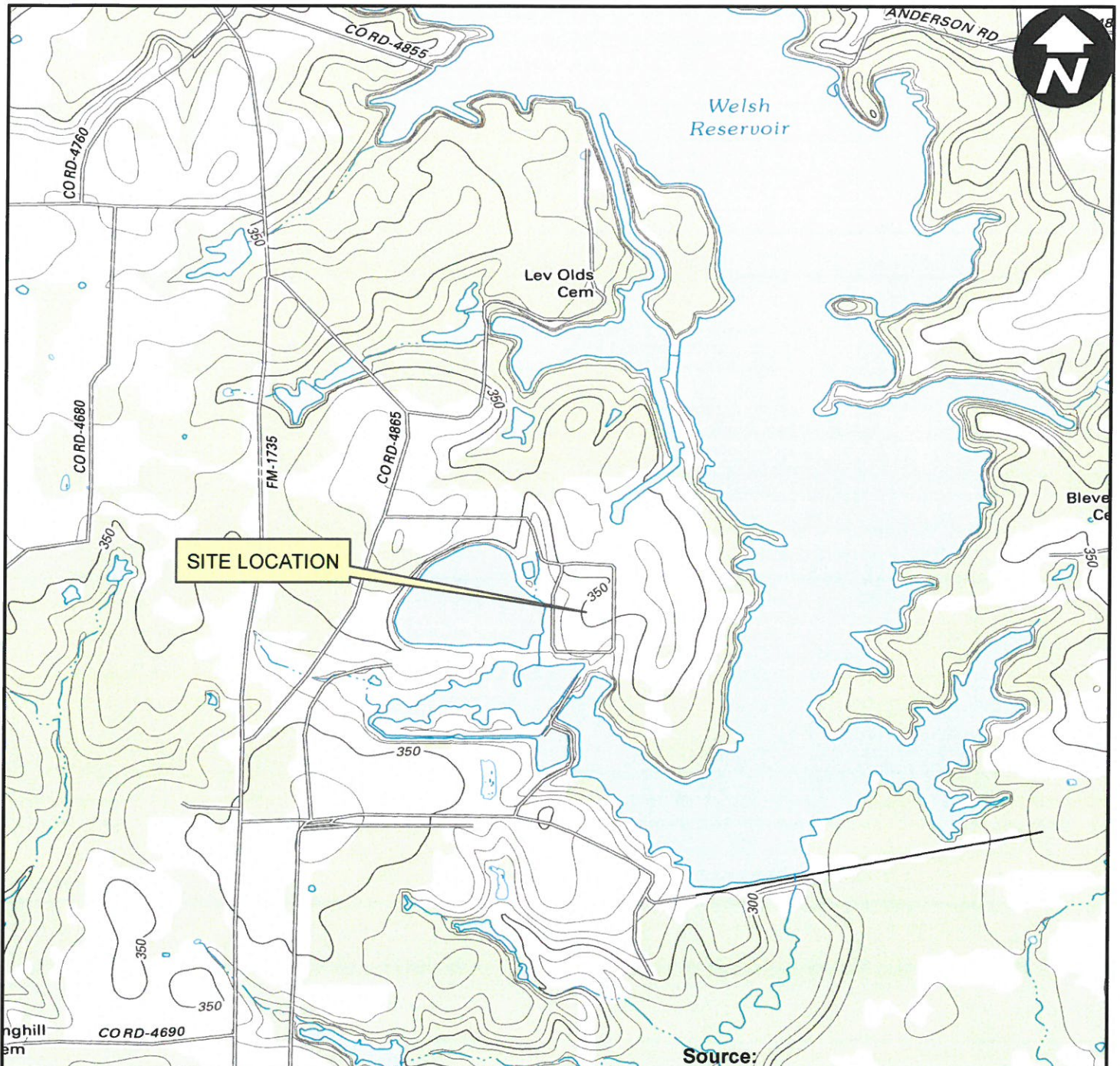
D=Downgradient

ft = feet

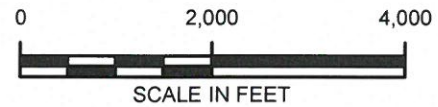
amsl = above mean sea level



Figures

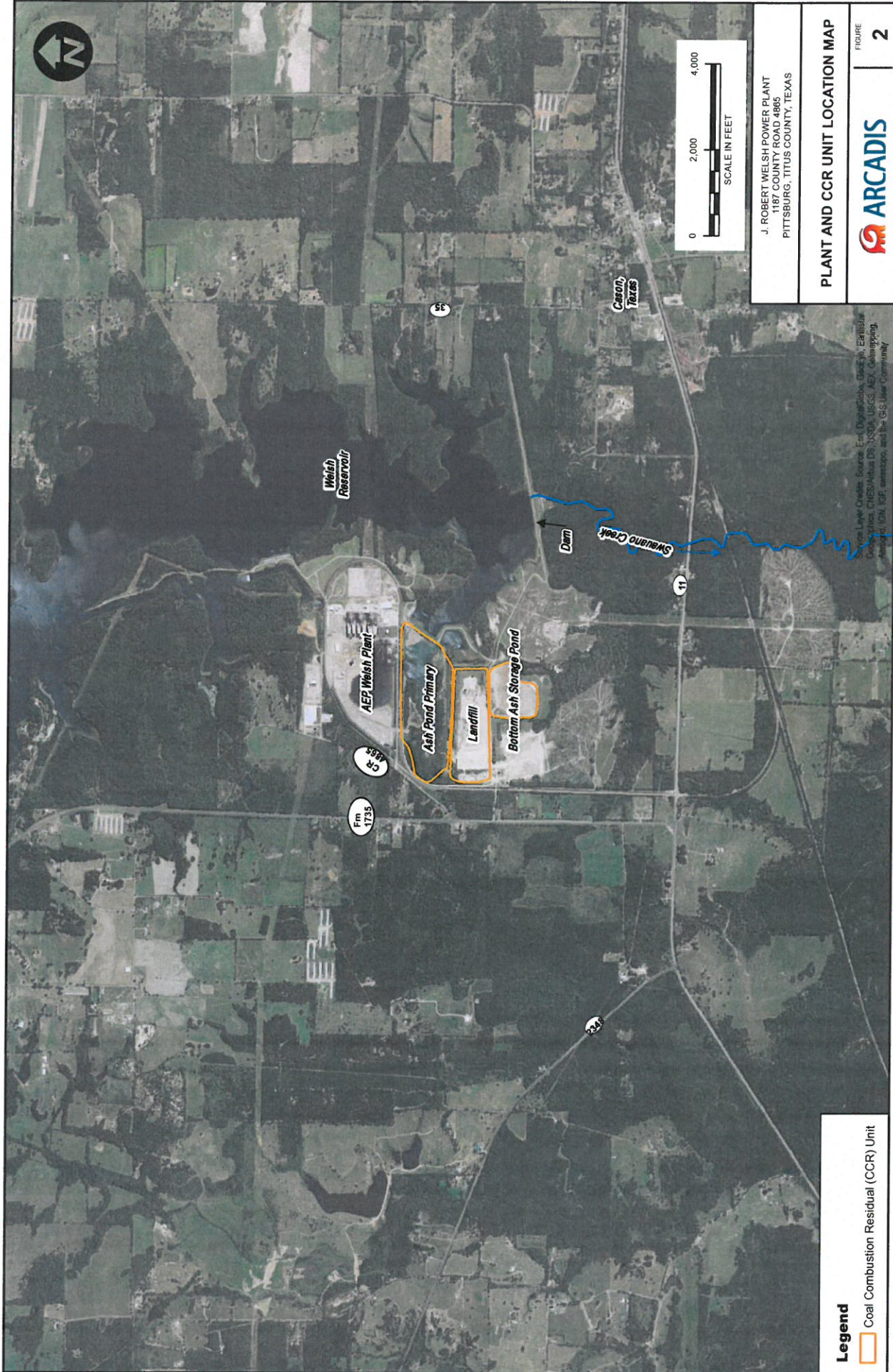


Source:
7.5 minute topographic quadrangle
Cason, Texas, 2013



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

SITE LOCATION MAP



J. ROBERT WELSH POWER PLANT
 1167 COUNTY ROAD 4885
 PITTSBURG, TITUS COUNTY, TEXAS

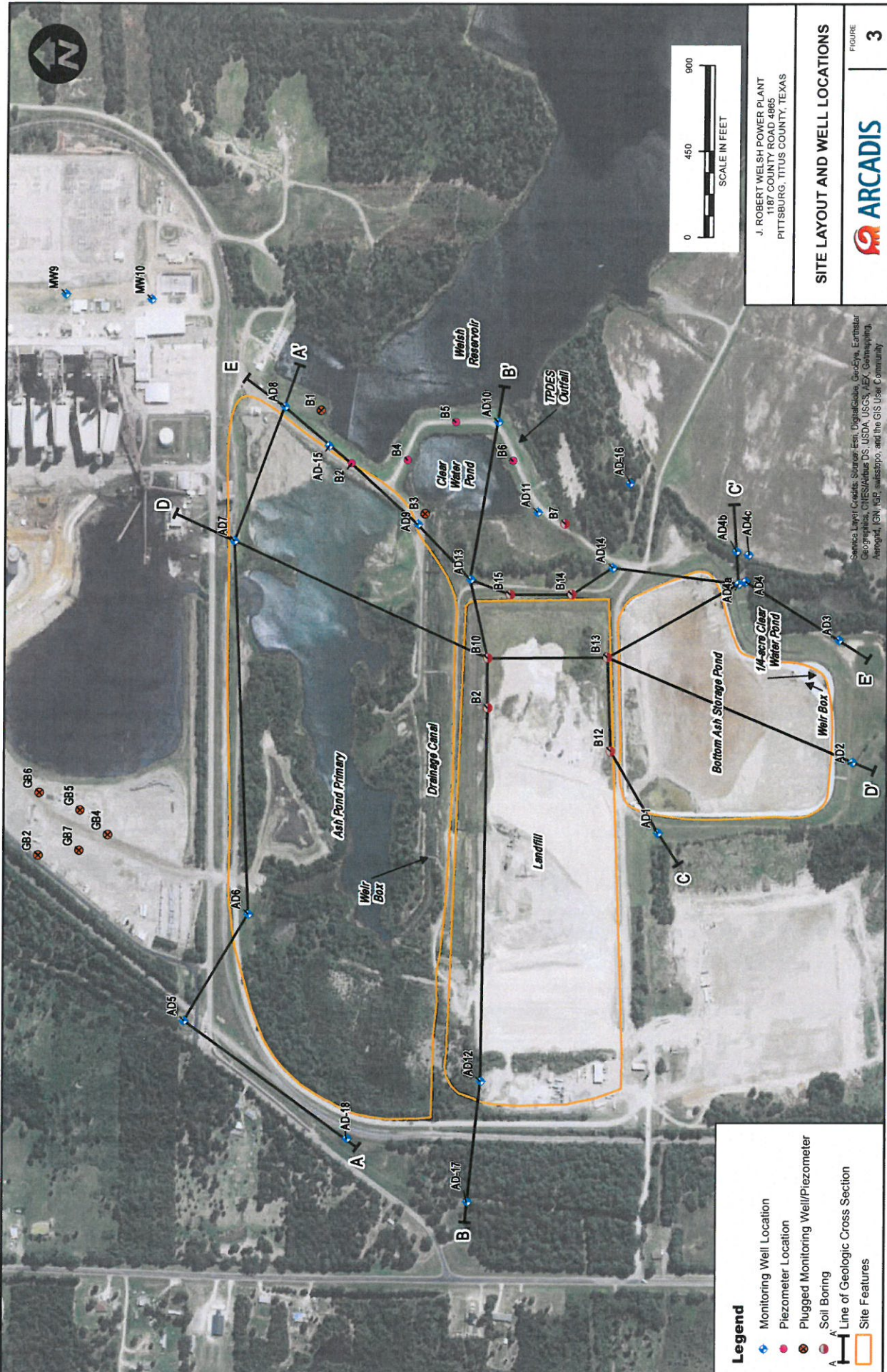
PLANT AND CCR UNIT LOCATION MAP

FIGURE **2**

Legend

- Coal Combustion Residual (CCR) Unit

Source Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, AeroX, IGN, Selenia,
 AeroGRID, IGN, IGP, swisstopo, and the GIS User Community



J. ROBERT WELSH POWER PLANT
 1167 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

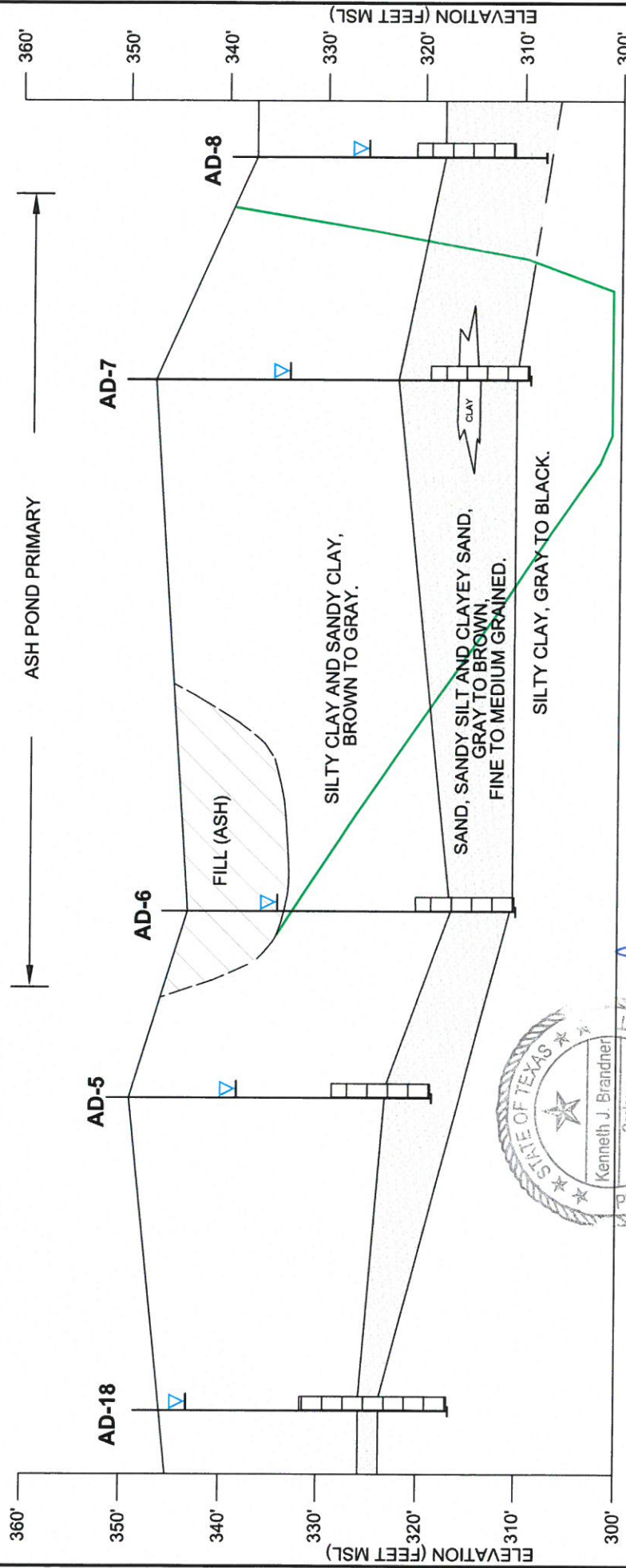
SITE LAYOUT AND WELL LOCATIONS

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, AeroX, GeoEye, IGN,
 Aeroged, IGN, INR, Swisstopo, and the GIS User Community

- Legend**
- Monitoring Well Location
 - Piezometer Location
 - Plugged Monitoring Well/Piezometer
 - Soil Boring
 - Line of Geologic Cross Section
 - Site Features

WEST
A

EAST
A'



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

**CROSS SECTION
A - A'**

ARCADIS

FIGURE
4

- LEGEND**
- MONITORING WELL SCREENED INTERVAL
 - WATER LEVEL IN MONITORING WELL (3/4/16)
 - PROJECTED BASE OF ASH POND (SEE NOTE)

NOTE: BASE OF ASH POND TAKEN FROM "WELSH POWER PLANT UNIT 1 FLY ASH STORAGE AREA PHASE 1" DRAWING ID: WEPX-88, DATED 12-3-76; AND U.S. GEOLOGICAL SURVEY 7 1/2 MINUTE SERIES TOPOGRAPHIC MAP, CASON, TX QUADRANGLE, 1964 (PHOTO REVISED 1980).

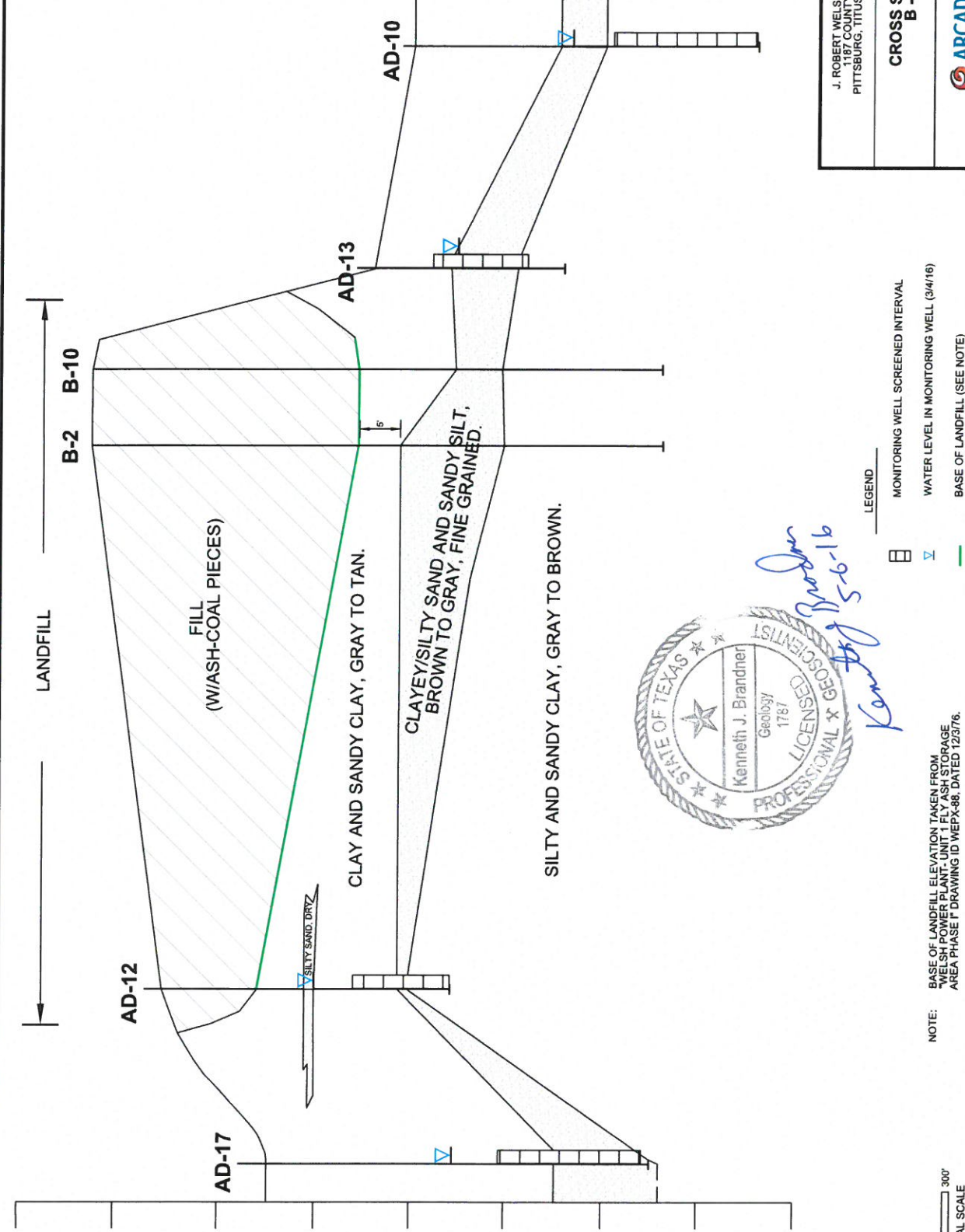


Kenneth J. Brandner
5-6-16

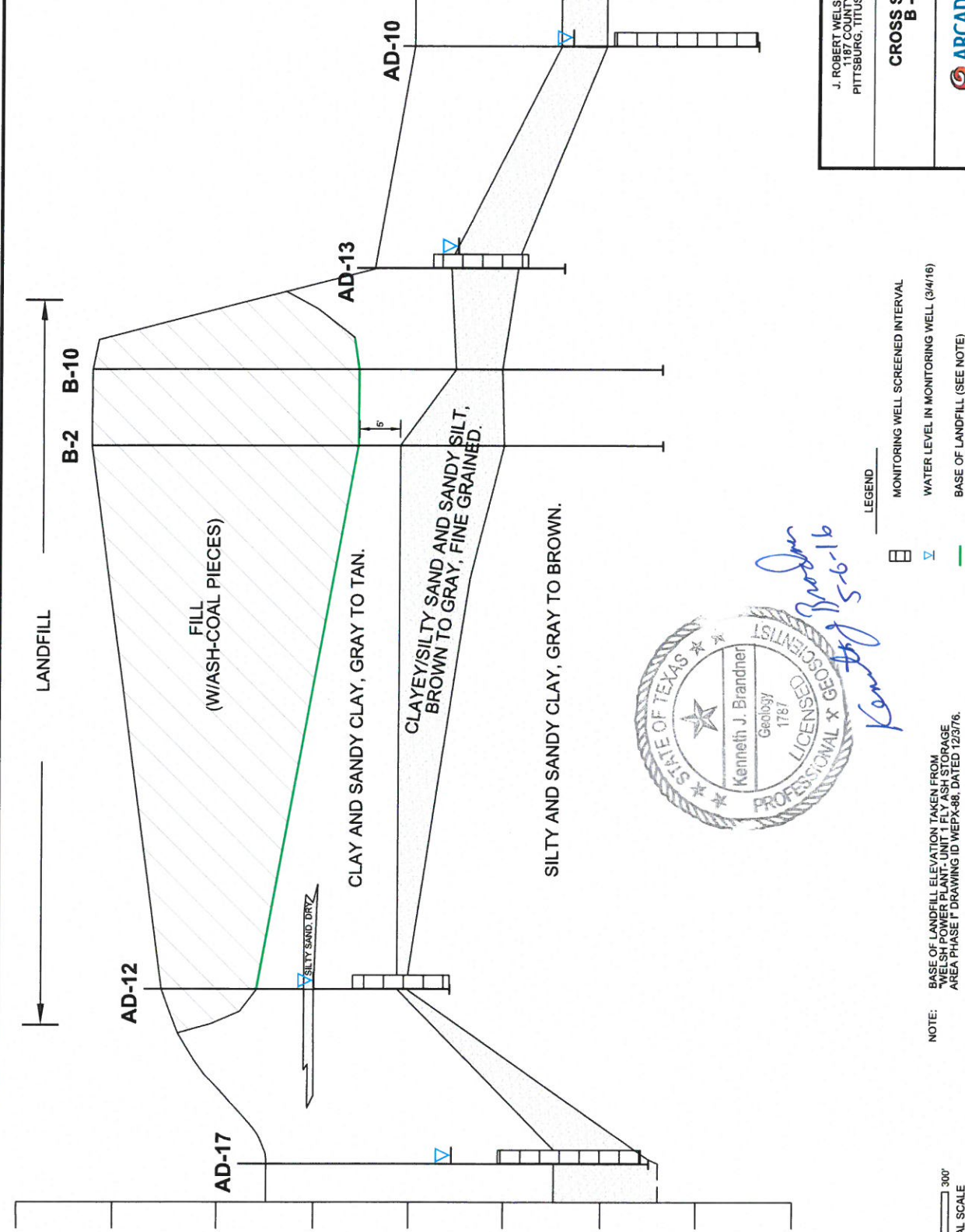


WEST
B

EAST
B'



ELEVATION (FEET MSL)



ELEVATION (FEET MSL)

0 300'
HORIZONTAL SCALE

NOTE: BASE OF LANDFILL ELEVATION TAKEN FROM WELSH POWER PLANT AREA PHASE I DRAWING ID WEPX-88, DATED 12/3/76.

LEGEND

J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
B - B'

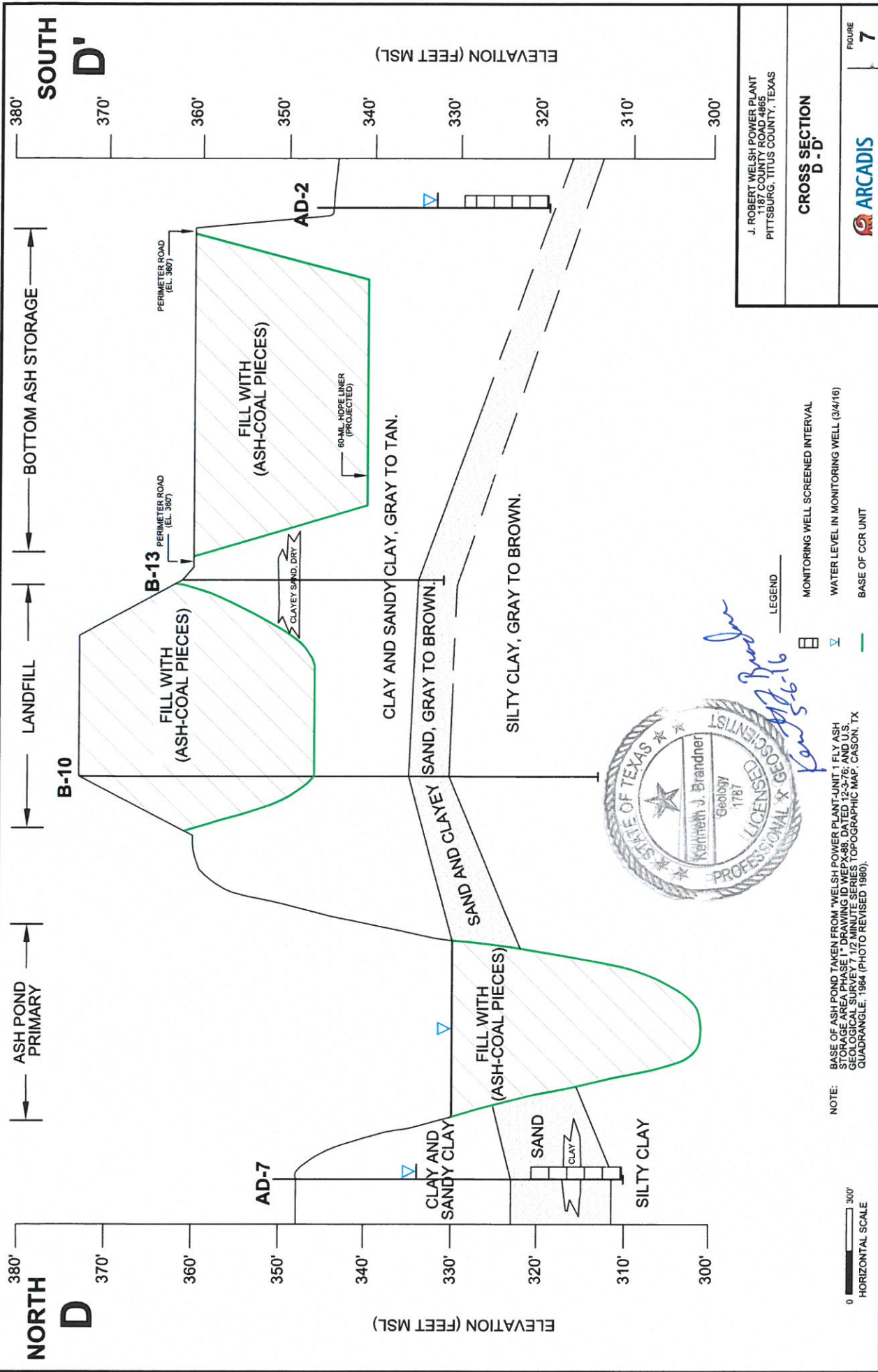
FIGURE
5



Kenneth J. Brandner 5-6-16

CITY: DRG/GRP: DB: LD: AM: PD: TML: TR: LYR/OM: C/P/R/SEF: 0/4/26 1/18/2016 12:33 PM: BR: LEASE: DANA

1 - PLOTTED: 3/1/2016 12:33 PM: BR: LEASE: DANA



J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4865
 PITTSBURG, TITUS COUNTY, TEXAS

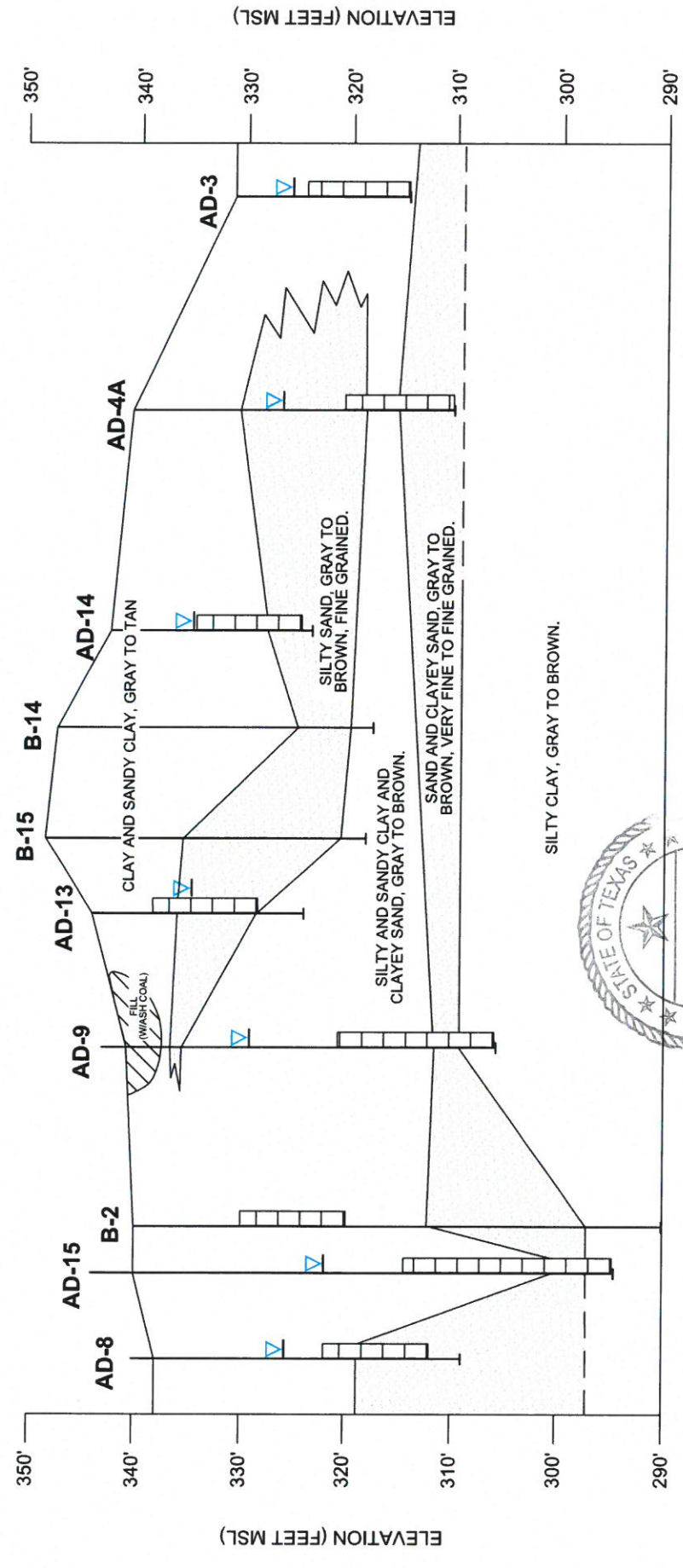
CROSS SECTION D-D'

ARCADIS

FIGURE 7

NORTH
E'

SOUTH
E'



J. ROBERT WELSH POWER PLANT
1187 COUNTY ROAD 4865
PITTSBURG, TITUS COUNTY, TEXAS

CROSS SECTION
E - E'

ARCADIS

FIGURE
8



J. ROBERT WELSH POWER PLANT
 1987 COUNTY ROAD 4695
 PITTSBURG, TITUS COUNTY, TEXAS

**WELL ELEVATIONS AND
 POTENTIOMETRIC MAP**
 MARCH 4, 2016

ARCADIS

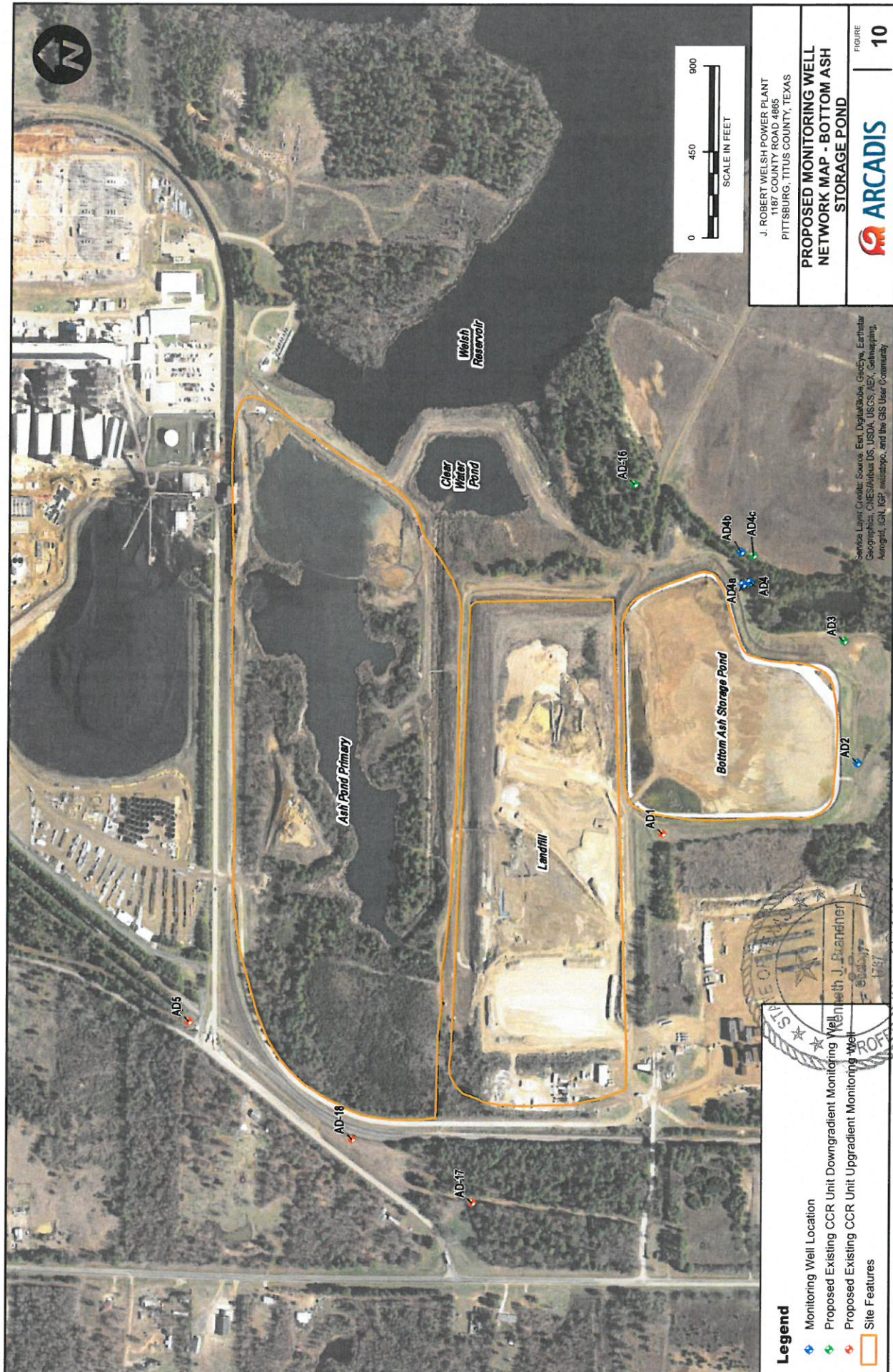
FIGURE 9

Source Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, AEX, Geomatics,
 Aerialport, CNR, IGN, swisstopo, and the GIS User Community

- Legend**
- Monitoring Well Location
 - Piezometer Location
 - Plugged Monitoring Well/Piezometer
 - Soil Boring
 - Site Features
 - 340.82 Water Level Elevation (feet MSL)
 - Groundwater Contour
 - Groundwater Flow Direction



Kenneth J. Brandner 5-6-16



J. ROBERT WELSH POWER PLANT
 1187 COUNTY ROAD 4885
 PITTSBURG, TITUS COUNTY, TEXAS

**PROPOSED MONITORING WELL
 NETWORK MAP - BOTTOM ASH
 STORAGE POND**

ARCADIS

FIGURE
10

Service Layer Credits: Source: Esri, DigitalGlobe, GeoEye, Earthstar
 Geographics, CNES/Airbus DS, USDA, USGS, AeroX, GeoEye, Earthstar
 AeroGrid, IGN, IGP, Swisstopo, and the GIS User Community

Legend

- ◆ Monitoring Well Location
- ◆ Proposed Existing CCR Unit Downgradient Monitoring Well
- ◆ Proposed Existing CCR Unit Upgradient Monitoring Well
- Site Features



Keith J. Brandler
 5-6-16



Appendix A

Boring/Well Construction Logs

AD-1

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: Confidentiality Privilege Notice on Reverse Side		State of Texas WELL REPORT		Texas Water Well Drillers Advisory Council P.O. Box 13087 Austin, TX 78711-3087 512-239-0530																					
1) OWNER <u>Southwestern Electric Power</u> (Name)		ADDRESS <u>Rt. 4, Box 221 Pittsburg Tx</u> (Street or RFD) (City) (State) (Zip) <u>75686</u>																							
2) ADDRESS OF WELL: County <u>Camp</u> <u>Titus</u> (Street, RFD or other) (City) (State) (Zip) <u>Pittsburg Tx 75686</u>		GRID # <u>No-58-4</u>																							
3) TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging		4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No		5) <u>GPS</u> <u>33°02'48"N</u> <u>94°50'47"W</u> N																					
6) WELL LOG: Date Drilling: Started <u>1-11</u> to <u>2001</u> Completed <u>1-11</u> to <u>2001</u>		DIAMETER OF HOLE Dia. (In.) From (ft.) To (ft.) <u>8 1/4</u> Surface <u>25</u>		7) DRILLING METHOD (Check): <input type="checkbox"/> Driven <input type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input checked="" type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jotted <input type="checkbox"/> Other _____																					
From (ft.) To (ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Wall <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If Gravel Packed give interval ... from <u>1.3</u> ft. to <u>2.5</u> ft.																							
<u>0 - 25</u> <u>gray silty clay with some hard red streaks</u>		CASING, BLANK PIPE, AND WELL SCREEN DATA:																							
<u>AP-1</u>		<table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Dia. (In.)</th> <th rowspan="2">New or Used</th> <th rowspan="2">Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial</th> <th colspan="2">Setting (ft.)</th> <th rowspan="2">Gage Casting Screen</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td><u>2</u></td> <td><u>N</u></td> <td><u>riser</u></td> <td><u>+2</u></td> <td><u>15</u></td> <td><u>Sch 40</u></td> </tr> <tr> <td><u>2</u></td> <td><u>N</u></td> <td><u>#10s/6t screen</u></td> <td><u>15</u></td> <td><u>25</u></td> <td><u>Sch 40</u></td> </tr> </tbody> </table>				Dia. (In.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen	From	To	<u>2</u>	<u>N</u>	<u>riser</u>	<u>+2</u>	<u>15</u>	<u>Sch 40</u>	<u>2</u>	<u>N</u>	<u>#10s/6t screen</u>	<u>15</u>	<u>25</u>	<u>Sch 40</u>
Dia. (In.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen																				
			From	To																					
<u>2</u>	<u>N</u>	<u>riser</u>	<u>+2</u>	<u>15</u>	<u>Sch 40</u>																				
<u>2</u>	<u>N</u>	<u>#10s/6t screen</u>	<u>15</u>	<u>25</u>	<u>Sch 40</u>																				
(Use reverse side if necessary)		9) CEMENTING DATA [Rule 338.44(1)] Cemented from <u>13</u> ft. to <u>0</u> ft. No. of sacks used <u>6-50#</u> ft. to _____ ft. No. of sacks used _____ Method used <u>bentonite</u> Cemented by _____ Distance to septic system field lines or other concentrated contamination _____ ft. Method of verification of above distance _____																							
13) TYPE PUMP: <u>NA</u> <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bowls, cylinder, jet, etc., _____ ft.		10) SURFACE COMPLETION <input checked="" type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input checked="" type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pitless Adapter Used [Rule 338.44(3)(b)] <input type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]																							
14) WELL TESTS: <u>NA</u> Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Bailor <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		11) WATER LEVEL: Static level <u>12'8"</u> ft. below land surface Date <u>1-11-01</u> Artesian flow _____ gpm. Date _____																							
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		12) PACKERS: <u>NA</u> Type _____ Depth _____																							
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.																									
COMPANY NAME _____ (Type or print)		WELL DRILLER'S LICENSE NO. <u>TX-52694-M</u>																							
ADDRESS _____ (Street or RFD) (City) (State) (Zip)																									
(Signed) <u>Arthur M. [Signature]</u> (Licensed Well Driller)		(Signed) _____ (Registered Driller Trainee)																							

Please attach electric log, chemical analysis, and other pertinent information, if available.

AD-2

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

**State of Texas
WELL REPORT**

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

1) OWNER Southwestern Electric ADDRESS Rt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Rt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-58-4
County Campan (City) (State) (Zip)
Titus

3) TYPE OF WORK (Check):
 New Well Deepening
 Reconditioning Plugging

4) PROPOSED USE (Check): Monitor Environmental Soil Boring Domestic
 Industrial Irrigation Injection Public Supply De-watering Testwell
 If Public Supply well, were plans submitted to the TNRCC? Yes No

5) GPS
33°02'37"N
94°50'44"W
 ↑

6) WELL LOG:
 Date Drilling: _____
 Started 4/26 ²⁰⁰¹
 Completed 4/26 ²⁰⁰¹

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
<u>8 1/4</u>	Surface	<u>25</u>

7) DRILLING METHOD (Check): Driven
 Air Rotary Mud Rotary Bored
 Air Hammer Cable Tool Jetted
 Other _____

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>2</u>	<u>top soil</u>
<u>2</u>	<u>5</u>	<u>red & gray clay w/ silt</u>
<u>5</u>	<u>10</u>	<u>red & gray clay w/ silt</u>
<u>10</u>	<u>25</u>	<u>gray silty clay with tan streaks</u>
<u>AP-2</u>		

8) Borehole Completion (Check): Open Hole Straight Wall
 Underreamed Gravel Packed Other _____
 If Gravel Packed give interval ... from 12 ft. to 25 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casing Screen
			From	To	
<u>2</u>	<u>N</u>	<u>Riser</u>	<u>+2</u>	<u>15</u>	<u>Sch 40</u>
<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>15</u>	<u>25</u>	<u>Sch 40</u>

9) CEMENTING DATA [Rule 338.44(1)]
 Cemented from 12 ft. to 2 ft. No. of sacks used 5-50#
 _____ ft. to _____ ft. No. of sacks used _____
 Method used bentonite pellets
 Cemented by _____
 Distance to septic system field lines or other concentrated contamination _____ ft.
 Method of verification of above distance _____

10) SURFACE COMPLETION
 Specified Surface Slab Installed [Rule 338.44(2)(A)]
 Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
 Pileless Adapter Used [Rule 338.44(3)(b)]
 Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
 Static level _____ ft. below land surface Date _____
 Artesian flow _____ gpm. Date _____

12) PACKERS: NA Type _____ Depth _____

13) TYPE PUMP: NA
 Turbine Jet Submersible Cylinder
 Other _____
 Depth to pump bowls, cylinder, jet, etc., _____ ft.

14) WELL TESTS: NA
 Type test: Pump Bailor Jetted Estimated
 Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
 Did you knowingly penetrate any strata which contained undesirable constituents?
 Yes No If yes, submit "REPORT OF UNDESIRABLE WATER"
 Type of water? _____ Depth of strata _____
 Was a chemical analysis made? Yes No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME _____ (Type or print) WELL DRILLER'S LICENSE NO. TX-52694-M

ADDRESS _____ (Street or RFD) (City) (State) (Zip)

(Signed) Michael M. Kelly (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

AD-3

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

**State of Texas
WELL REPORT**

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

1) OWNER Southwestern Electric ADDRESS Rt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Rt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-58-4
County Titus (Street, RFD or other) (City) (State) (Zip)

3) TYPE OF WORK (Check):
 New Well Deepening
 Reconditioning Plugging

4) PROPOSED USE (Check): Monitor Environmental Soil Boring Domestic
 Industrial Irrigation Injection Public Supply De-watering Testwell
 If Public Supply well, were plans submitted to the TNRCC? Yes No

5) WELL LOG:
 Date Drilling: _____
 Started 4/26 ²⁰⁰¹
 Completed 4/26 ²⁰⁰¹

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
8 1/4	Surface	17

7) DRILLING METHOD (Check): Driven
 Air Rotary Mud Rotary Bored
 Air Hammer Cable Tool Jetted
 Other _____

8) Borehole Completion (Check): Open Hole Straight Wall
 Underreamed Gravel Packed Other _____
 If Gravel Packed give Interval ... from 5 ft. to 17 ft.

9) CEMENTING DATA [Rule 338.44(1)]
 Cemented from 2 ft. to 5 ft. No. of sacks used 2 1/2 - 50
 Method used bentonite pellets
 Cemented by _____
 Distance to septic system field lines or other concentrated contamination _____ ft.
 Method of verification of above distance _____

10) SURFACE COMPLETION
 Specified Surface Slab Installed [Rule 338.44(2)(A)]
 Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
 Pileless Adapter Used [Rule 338.44(3)(b)]
 Approved Alternative Procedure Used [Rule 338.71]

11) WATER LEVEL:
 Static level: _____ ft. below land surface Date _____
 Artesian flow _____ gpm. Date _____

12) PACKERS: NA Type _____ Depth _____

13) TYPE PUMP: NA
 Turbine Jet Submersible Cylinder
 Other _____
 Depth to pump bowls, cylinder, jet, etc. _____ ft.

14) WELL TESTS: NA
 Type test: Pump Bailor Jetted Estimated
 Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

15) WATER QUALITY:
 Did you knowingly penetrate any strata which contained undesirable constituents?
 Yes No If yes, submit "REPORT OF UNDESIRABLE WATER"
 Type of water? _____ Depth of strata _____
 Was a chemical analysis made? Yes No

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME _____ (Type or print) WELL DRILLER'S LICENSE NO. TX 52694-M

ADDRESS _____ (City) _____ (State) _____ (Zip)

(Signed) J. Robert M. [Signature] (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.

AD-4

Please use black ink.

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Texas Water Well Drillers Advisory Council
P.O. Box 13087
Austin, TX 78711-3087
512-239-0530

ATTENTION OWNER: Confidentiality
Privilege Notice on Reverse Side

State of Texas WELL REPORT

1) OWNER Southwestern Electric Power ADDRESS Rt. 4, Box 221 Pittsburg Tx 75686
(Name) (Street or RFD) (City) (State) (Zip)

2) ADDRESS OF WELL: Pt. 4 Box 221 Pittsburg Tx 75686 GRID # 16-5B-4
County Camp (City) (State) (Zip)
Titus

3) TYPE OF WORK (Check):
 New Well Deepening
 Reconditioning Plugging

4) PROPOSED USE (Check): Monitor Environmental Soil Boring Domestic
 Industrial Irrigation Injection Public Supply De-watering Testwell
If Public Supply well, were plans submitted to the TNRCC? Yes No

5) GPS
33° 02' 43" N
94° 50' 33" W
↑

6) WELL LOG:
Date Drilling: _____
Started 4/26 ¹⁹ 2001
Completed 4/26 ¹⁹ 2001

DIAMETER OF HOLE		
Dia. (in.)	From (ft.)	To (ft.)
<u>8 1/4</u>	<u>Surface</u>	<u>30</u>

7) DRILLING METHOD (Check): Driven
 Air Rotary Mud Rotary Bored
 Air Hammer Cable Tool Jetted
 Other _____

From (ft.)	To (ft.)	Description and color of formation material
<u>0</u>	<u>5</u>	<u>red silty clay with gray streaks</u>
<u>5</u>	<u>30</u>	<u>gray silty clay with red streaks</u>

8) Borehole Completion (Check): Open Hole Straight Wall
 Underreamed Gravel Packed Other _____
If Gravel Packed give interval ... from 16 ft. to 30 ft.

CASING, BLANK PIPE, AND WELL SCREEN DATA:

Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen
			From	To	
<u>2</u>	<u>N</u>	<u>riser</u>	<u>+2</u>	<u>19</u>	<u>Sch 40</u>
<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>19</u>	<u>29</u>	<u>Sch 40</u>

(Use reverse side if necessary)

9) CEMENTING DATA [Rule 338.44(1)]
Cemented from 16 ft. to 2 ft. No. of sacks used 8-50 #
ft. to _____ ft. No. of sacks used _____
Method used bentonite pellets
Cemented by _____
Distance to septic system field lines or other concentrated contamination _____ ft.
Method of verification of above distance _____

13) TYPE PUMP:
 Turbine Jet Submersible Cylinder
 Other NA
Depth to pump bowls, cylinder, jet, etc., _____ ft.

10) SURFACE COMPLETION
 Specified Surface Slab Installed [Rule 338.44(2)(A)]
 Specified Steel Sleeve Installed [Rule 338.44(3)(A)]
 Pileless Adapter Used [Rule 338.44(3)(b)]
 Approved Alternative Procedure Used [Rule 338.71]

14) WELL TESTS: NA
Type test: Pump Bailor Jetted Estimated
Yield: _____ gpm with _____ ft. drawdown after _____ hrs.

11) WATER LEVEL:
Static level _____ ft. below land surface Date _____
Artesian flow _____ gpm. Date _____

15) WATER QUALITY:
Did you knowingly penetrate any strata which contained undesirable constituents?
 Yes No If yes, submit "REPORT OF UNDESIRABLE WATER"
Type of water? _____ Depth of strata _____
Was a chemical analysis made? Yes No

12) PACKERS: NA Type _____ Depth _____

I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.

COMPANY NAME _____ (Type or print) WELL DRILLER'S LICENSE NO. TX 52694-M

ADDRESS _____ (Street or RFD) (City) (State) (Zip)

(Signed) [Signature] (Licensed Well Driller) (Signed) _____ (Registered Driller Trainee)

Please attach electric log, chemical analysis, and other pertinent information, if available.



SOIL BORING LOG

BORING/WELL NO.: AD-4A
 TOTAL DEPTH: 30'
 TOP OF CASING ELEV.: 342.85 ft. NGVD
 GROUND SURFACE ELEV.: 340.19 ft. NGVD

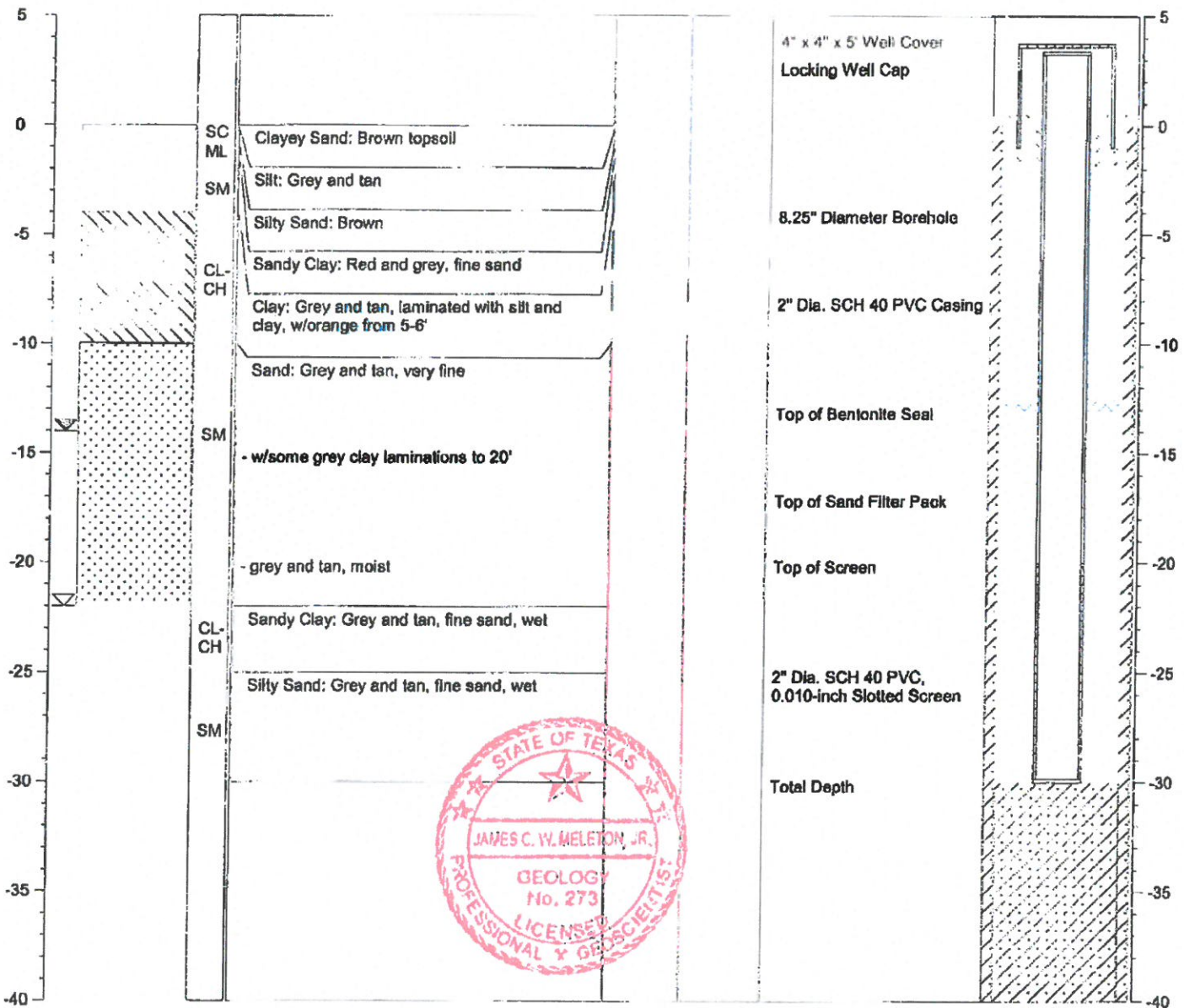
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04527
 Longitude: 94.84258

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-4B
 TOTAL DEPTH: 15'
 TOP OF CASING ELEV.: 333.23 ft. NGVD
 GROUND SURFACE ELEV.: 329.55 ft. NGVD

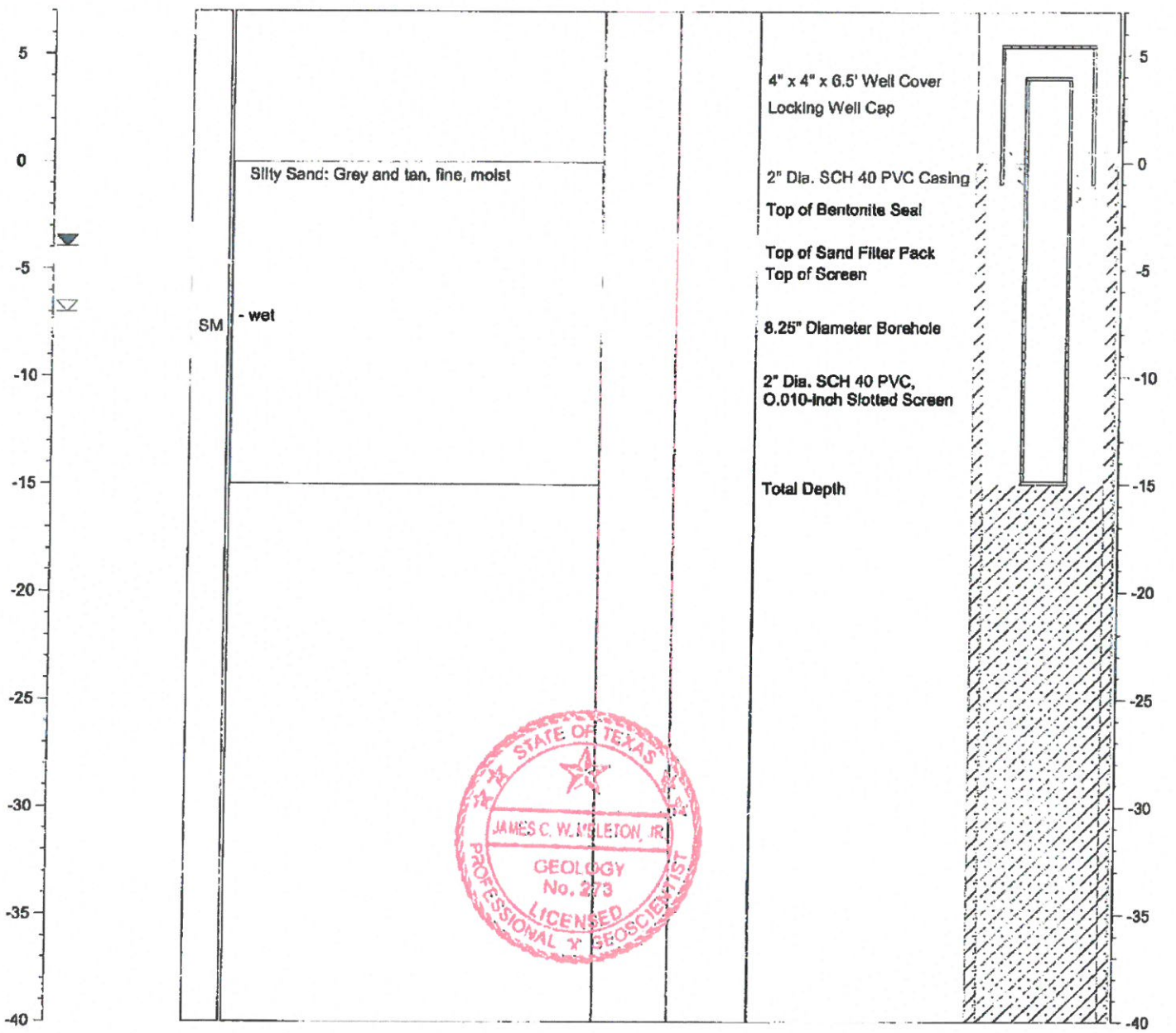
CLIENT: AEP	DRILLING CO.: WEST Drilling
PROJECT: Ash Disposal Area	DRILLER: Tom McCullough
SITE LOCATION: Welsh Power Plant	METHOD OF DRILLING: Hollow-stem Auger
PROJECT NO.: S-08-0109	SAMPLING METHODS: Split-spoon
LOGGED BY: James Meleton, Jr.	DATE DRILLED: 9/23/09

NOTES: Latitude: 33.04531
 Longitude: 94.84230

☞ Water level during drilling
 ☞ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-4C
 TOTAL DEPTH: 15'
 TOP OF CASING ELEV.: 333.28 ft. NGVD
 GROUND SURFACE ELEV.: 329.15 ft. NGVD

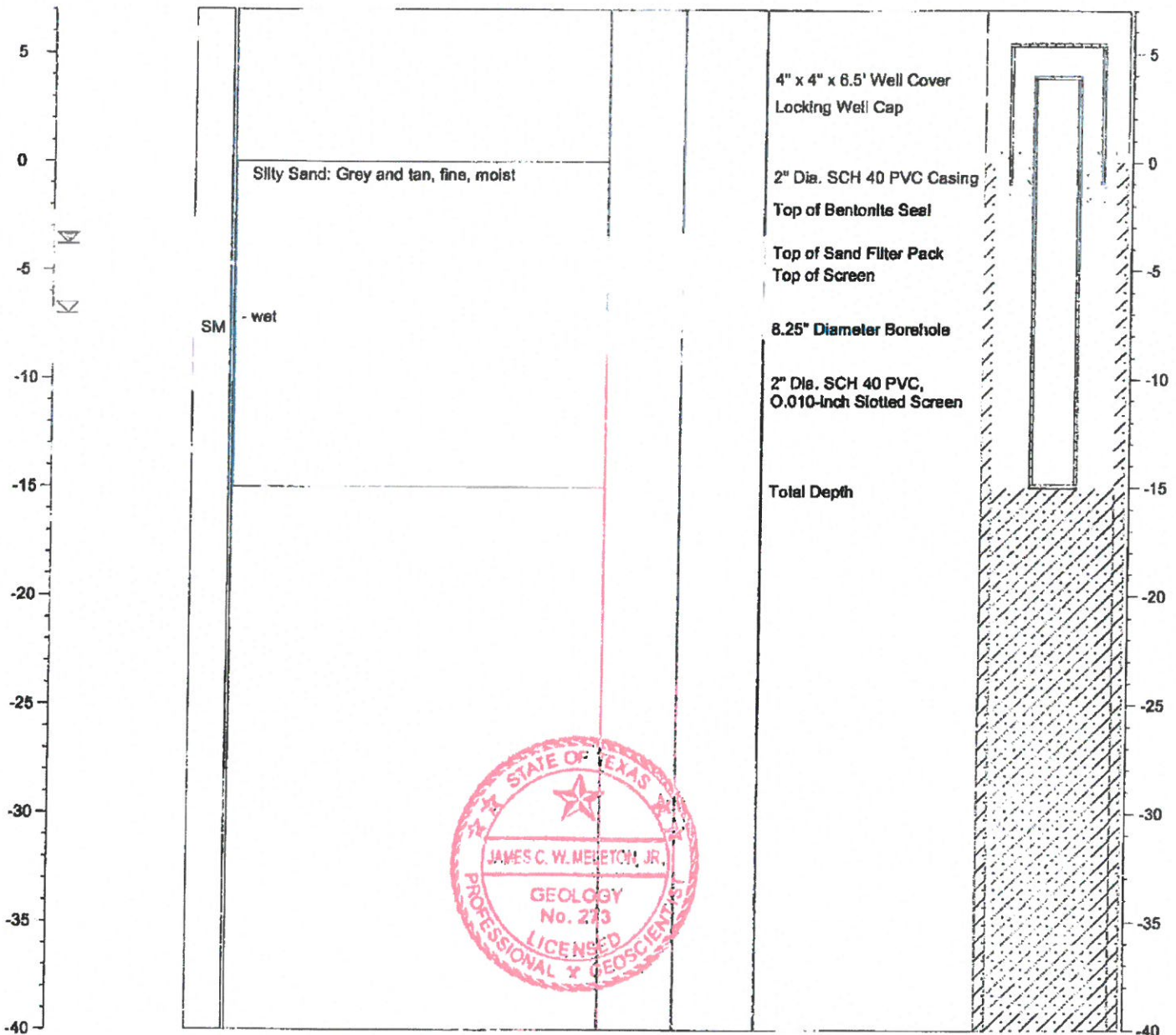
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/23/09

NOTES: Latitude: 33.04507
 Longitude: 94.84244

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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AD-5

Send original copy by certified mail to: TNRCC, P.O. Box 13087, Austin, TX 78711-3087

Please use black ink.

ATTENTION OWNER: <i>Confidentiality Privilege Notice on Reverse Side</i>		State of Texas WELL REPORT		Texas Water Well Drillers Advisory Council P.O. Box 13087 Austin, TX 78711-3087 512-239-0530																					
1) OWNER <u>Southwestern Electric Power</u> ADDRESS <u>Rt. 4, Box 221 Pittsburg Tx</u> <u>75686</u>		(Name) (Street or RFD) (City) (State) (Zip)																							
2) ADDRESS OF WELL: County <u>Titus</u> <u>Rt. 4, Box 221 Pittsburg Tx</u> <u>75686</u> GRID # <u>16-58-4</u>		(Street, RFD or other) (City) (State) (Zip)																							
3) TYPE OF WORK (Check): <input checked="" type="checkbox"/> New Well <input type="checkbox"/> Deepening <input type="checkbox"/> Reconditioning <input type="checkbox"/> Plugging		4) PROPOSED USE (Check): <input checked="" type="checkbox"/> Monitor <input type="checkbox"/> Environmental Soil Boring <input type="checkbox"/> Domestic <input type="checkbox"/> Industrial <input type="checkbox"/> Irrigation <input type="checkbox"/> Injection <input type="checkbox"/> Public Supply <input type="checkbox"/> De-watering <input type="checkbox"/> Testwell If Public Supply well, were plans submitted to the TNRCC? <input type="checkbox"/> Yes <input type="checkbox"/> No		5) <u>33°03'13"N</u> <u>94°51'00"W</u>																					
6) WELL LOG: Date Drilling: Started <u>1-11-2001</u> Completed <u>1-11-2001</u>		DIAMETER OF HOLE Dia. (in.) From (ft.) To (ft.) <u>8 1/4</u> Surface <u>30</u>		7) DRILLING METHOD (Check): <input type="checkbox"/> Driven <input type="checkbox"/> Air Rotary <input type="checkbox"/> Mud Rotary <input checked="" type="checkbox"/> Bored <input type="checkbox"/> Air Hammer <input type="checkbox"/> Cable Tool <input type="checkbox"/> Jetted <input type="checkbox"/> Other _____																					
From (ft.) To (ft.) Description and color of formation material		8) Borehole Completion (Check): <input type="checkbox"/> Open Hole <input type="checkbox"/> Straight Well <input type="checkbox"/> Underreamed <input checked="" type="checkbox"/> Gravel Packed <input type="checkbox"/> Other _____ If Gravel Packed give interval ... from <u>16</u> ft. to <u>30</u> ft.																							
<u>0 - 10</u> <u>red & gray clay with orange streaks</u>		CASING, BLANK PIPE, AND WELL SCREEN DATA: <table border="1" style="width:100%; border-collapse: collapse;"> <thead> <tr> <th rowspan="2">Dia. (in.)</th> <th rowspan="2">New or Used</th> <th rowspan="2">Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial</th> <th colspan="2">Setting (ft.)</th> <th rowspan="2">Gage Casting Screen</th> </tr> <tr> <th>From</th> <th>To</th> </tr> </thead> <tbody> <tr> <td><u>2</u></td> <td><u>N</u></td> <td><u>riser</u></td> <td><u>+2</u></td> <td><u>20</u></td> <td><u>sch 40</u></td> </tr> <tr> <td><u>2</u></td> <td><u>N</u></td> <td><u>#10 slot screen</u></td> <td><u>20</u></td> <td><u>30</u></td> <td><u>sch 40</u></td> </tr> </tbody> </table>				Dia. (in.)	New or Used	Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen	From	To	<u>2</u>	<u>N</u>	<u>riser</u>	<u>+2</u>	<u>20</u>	<u>sch 40</u>	<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>20</u>	<u>30</u>	<u>sch 40</u>
Dia. (in.)	New or Used								Steel, Plastic, etc. Perf., Slotted, etc. Screen Mfg., if commercial	Setting (ft.)		Gage Casting Screen													
						From	To																		
<u>2</u>	<u>N</u>					<u>riser</u>	<u>+2</u>	<u>20</u>	<u>sch 40</u>																
<u>2</u>	<u>N</u>	<u>#10 slot screen</u>	<u>20</u>	<u>30</u>	<u>sch 40</u>																				
<u>10 - 20</u> <u>gray/black clay with tan clay</u>																									
<u>20 - 25</u> <u>stiff clay with lignite streak</u>																									
<u>25 - 30</u> <u>fine gray sand</u>																									
(Use reverse side if necessary)		9) CEMENTING DATA [Rule 338.44(1)] Cemented from <u>16</u> ft. to <u>0</u> ft. No. of sacks used _____ ft. to _____ ft. No. of sacks used _____ Method used <u>bentonite</u> Cemented by _____ Distance to septic system field lines or other concentrated contamination _____ ft. Method of verification of above distance _____																							
13) TYPE PUMP: <input type="checkbox"/> Turbine <input type="checkbox"/> Jet <input type="checkbox"/> Submersible <input type="checkbox"/> Cylinder <input type="checkbox"/> Other _____ Depth to pump bows, cylinder, jet, etc. _____ ft.		10) SURFACE COMPLETION <input checked="" type="checkbox"/> Specified Surface Slab Installed [Rule 338.44(2)(A)] <input checked="" type="checkbox"/> Specified Steel Sleeve Installed [Rule 338.44(3)(A)] <input type="checkbox"/> Pileless Adapter Used [Rule 338.44(3)(b)] <input type="checkbox"/> Approved Alternative Procedure Used [Rule 338.71]																							
14) WELL TESTS: Type test: <input type="checkbox"/> Pump <input type="checkbox"/> Bailor <input type="checkbox"/> Jetted <input type="checkbox"/> Estimated Yield: _____ gpm with _____ ft. drawdown after _____ hrs.		11) WATER LEVEL: Static level <u>11'9"</u> ft. below land surface Date <u>1-11-01</u> Artesian flow _____ gpm. Date _____																							
15) WATER QUALITY: Did you knowingly penetrate any strata which contained undesirable constituents? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If yes, submit "REPORT OF UNDESIRABLE WATER" Type of water? _____ Depth of strata _____ Was a chemical analysis made? <input type="checkbox"/> Yes <input type="checkbox"/> No		12) PACKERS: <u>NA</u> Type _____ Depth _____																							
I hereby certify that this well was drilled by me (or under my supervision) and that each and all of the statements herein are true to the best of my knowledge and belief. I understand that failure to complete items 1 thru 15 will result in the log(s) being returned for completion and resubmittal.																									
COMPANY NAME _____ (Type or print)		WELL DRILLER'S LICENSE NO. <u>TX 52694-M</u>																							
ADDRESS _____ (Street or RFD)		(City)		(State) (Zip)																					
(Signed) <u>[Signature]</u> (Licensed Well Driller)		(Signed) _____		(Registered Driller Trainee)																					

Please attach electric log, chemical analysis, and other pertinent information, if available.



SOIL BORING LOG

BORING/WELL NO.: AD-6
 TOTAL DEPTH: 33'
 TOP OF CASING ELEV.: 346.33 ft. NGVD
 GROUND SURFACE ELEV.: 343.31 ft. NGVD

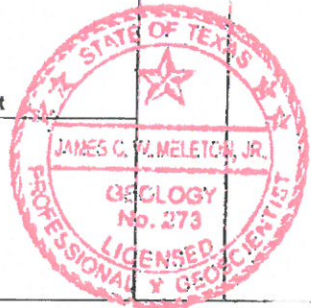
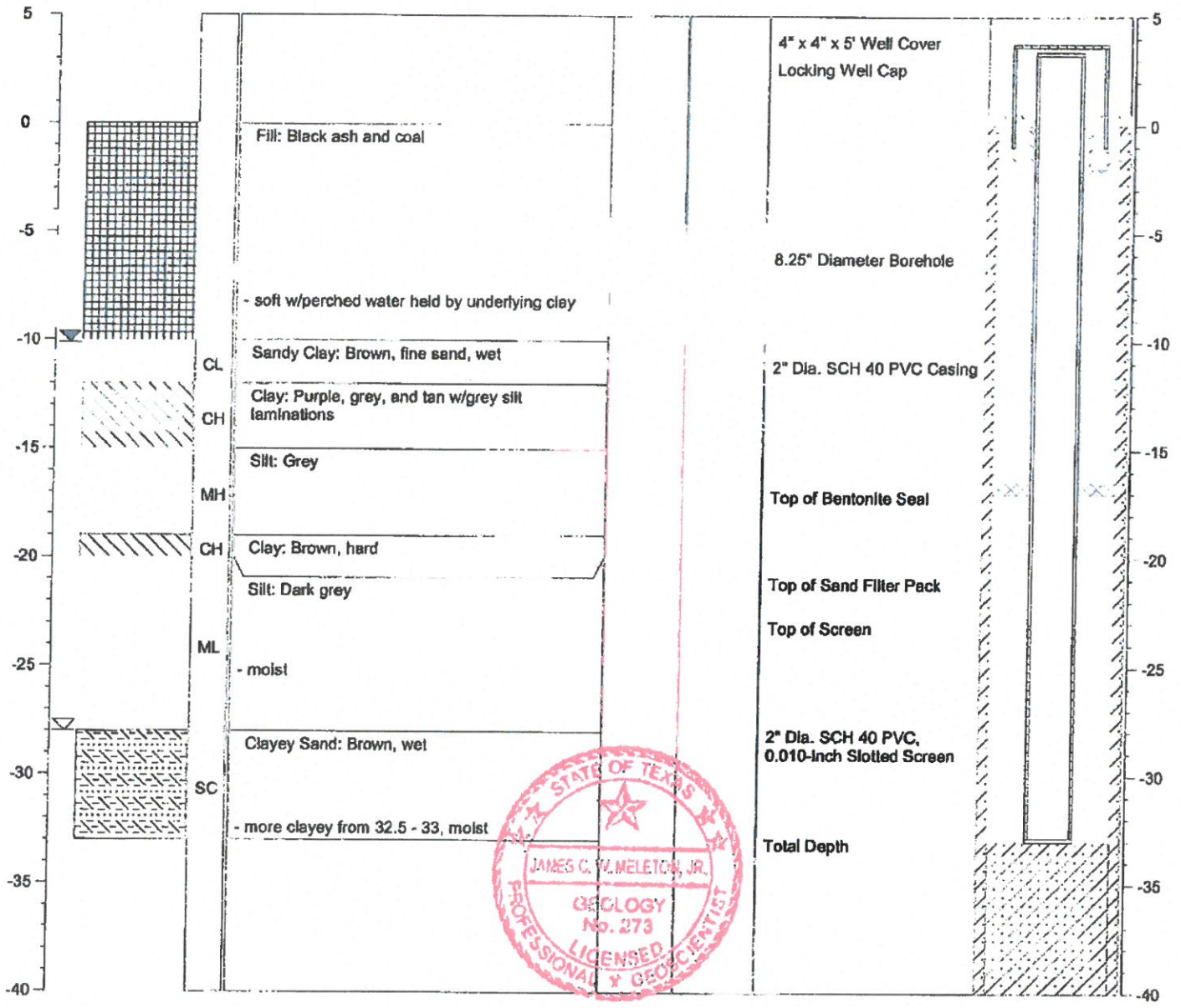
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/23/09

NOTES: Latitude: 33.05235
 Longitude: 94.84757

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-7
 TOTAL DEPTH: 38'
 TOP OF CASING ELEV.: 350.82 ft. NGVD
 GROUND SURFACE ELEV.: 347.86 ft. NGVD

CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

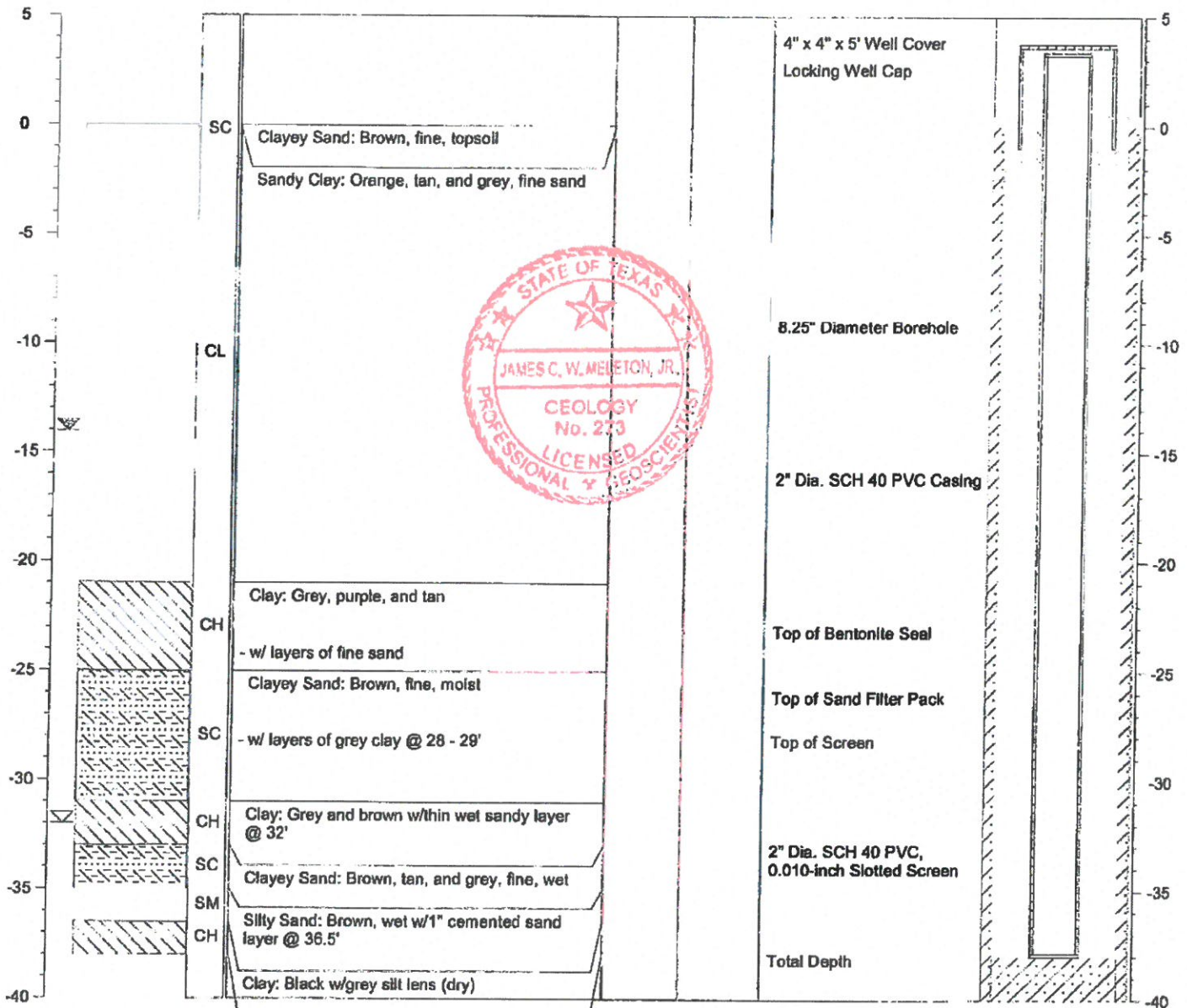
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/24/09

NOTES: Latitude: 33.05257
 Longitude: 94.84219

☒ Water level during drilling
 ☒ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-8
 TOTAL DEPTH: 29'
 TOP OF CASING ELEV.: 340.01 ft. NGVD
 GROUND SURFACE ELEV.: 337.53 ft. NGVD

CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

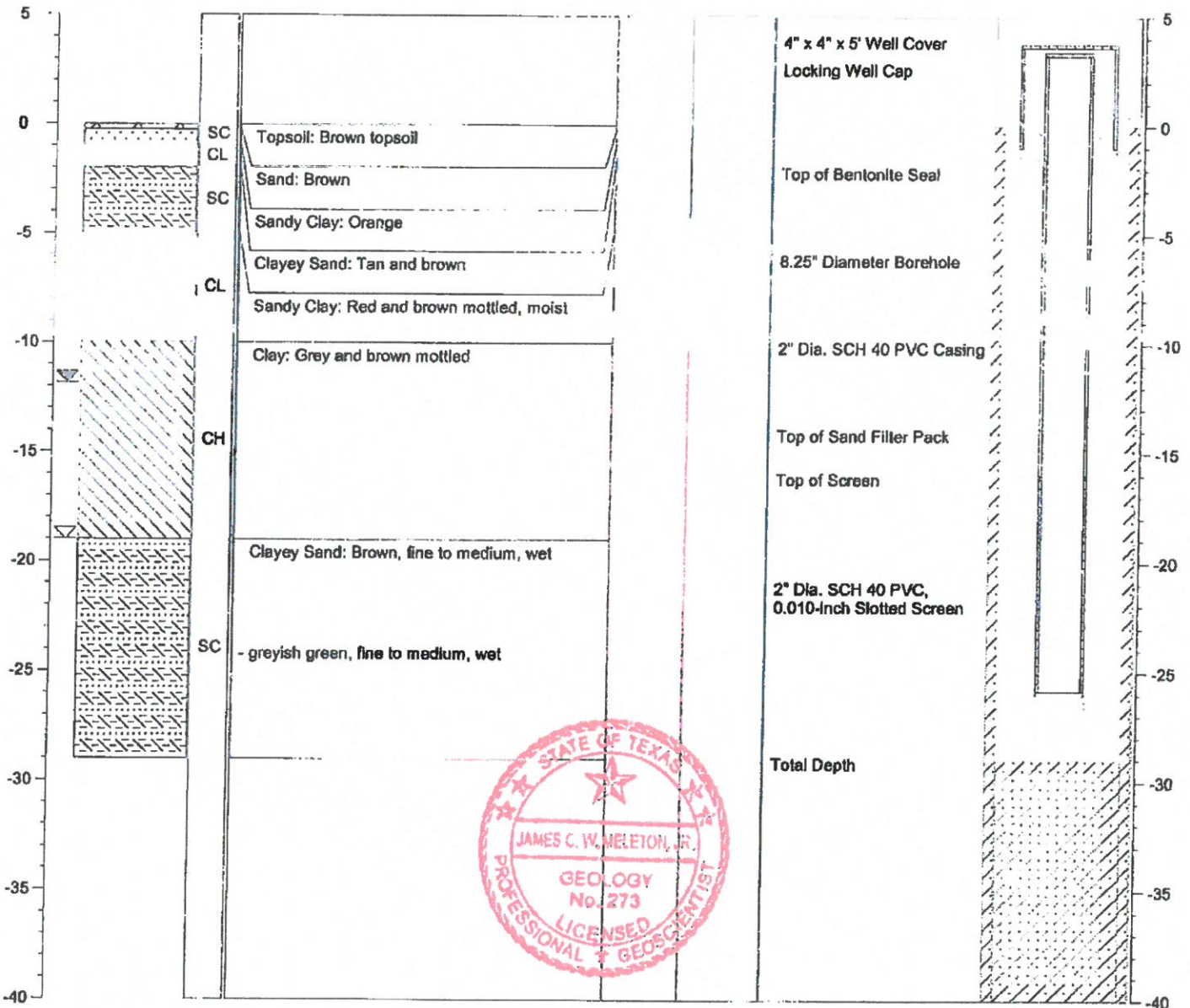
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/21/09

NOTES: Latitude: 33.05187
 Longitude: 94.84026

☒ Water level during drilling
 ☒ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-9
 TOTAL DEPTH: 35'
 TOP OF CASING ELEV.: 343.09 ft. NGVD
 GROUND SURFACE ELEV.: 340.32 ft. NGVD

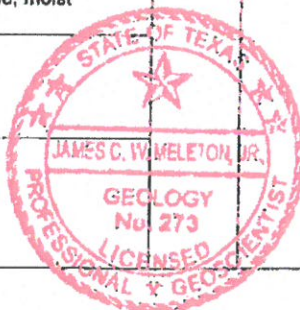
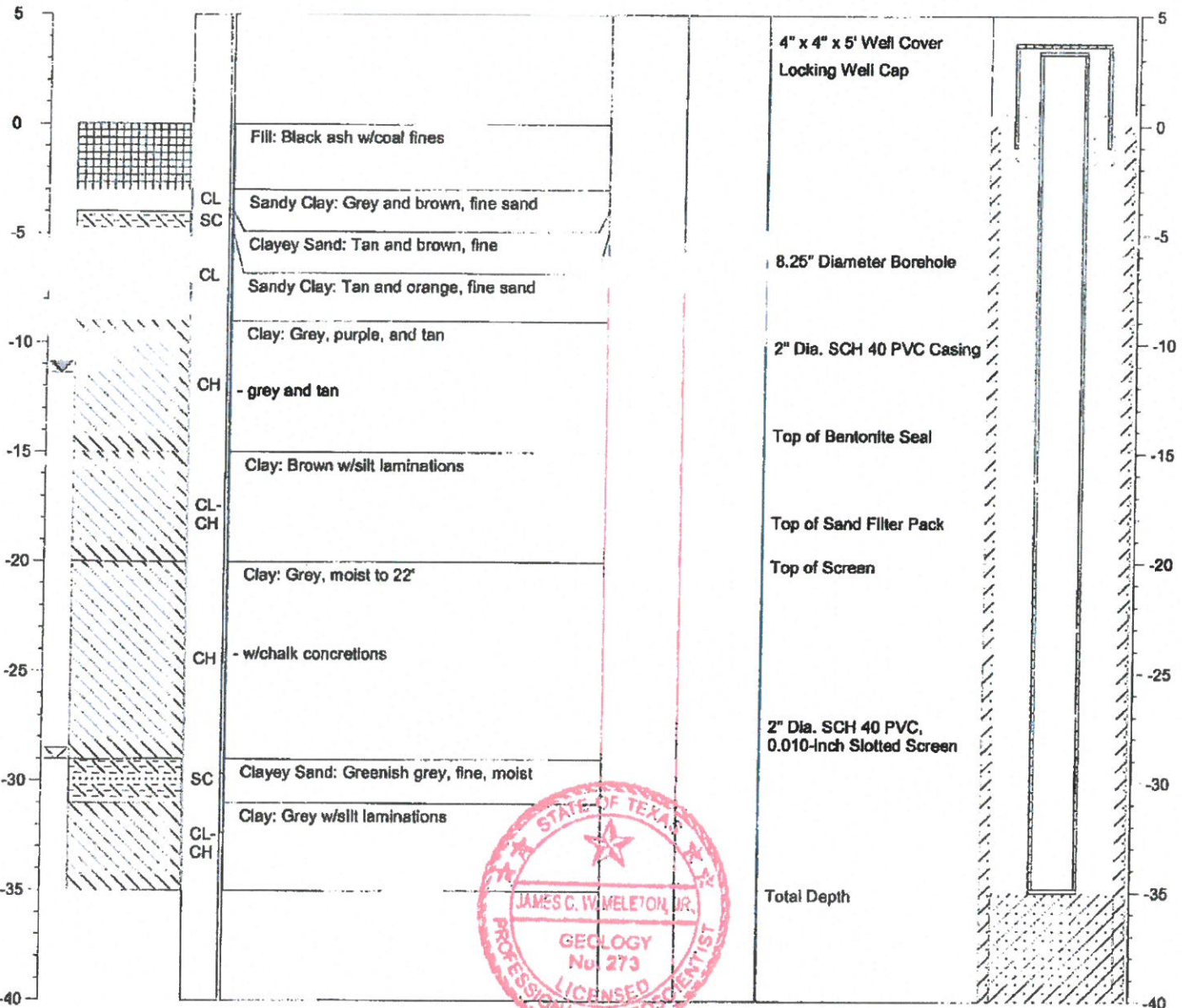
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/21/09

NOTES: Latitude: 33.04995
 Longitude: 94.84196

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PIID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-10
 TOTAL DEPTH: 35'
 TOP OF CASING ELEV.: 343.01 ft. NGVD
 GROUND SURFACE ELEV.: 340.23 ft. NGVD

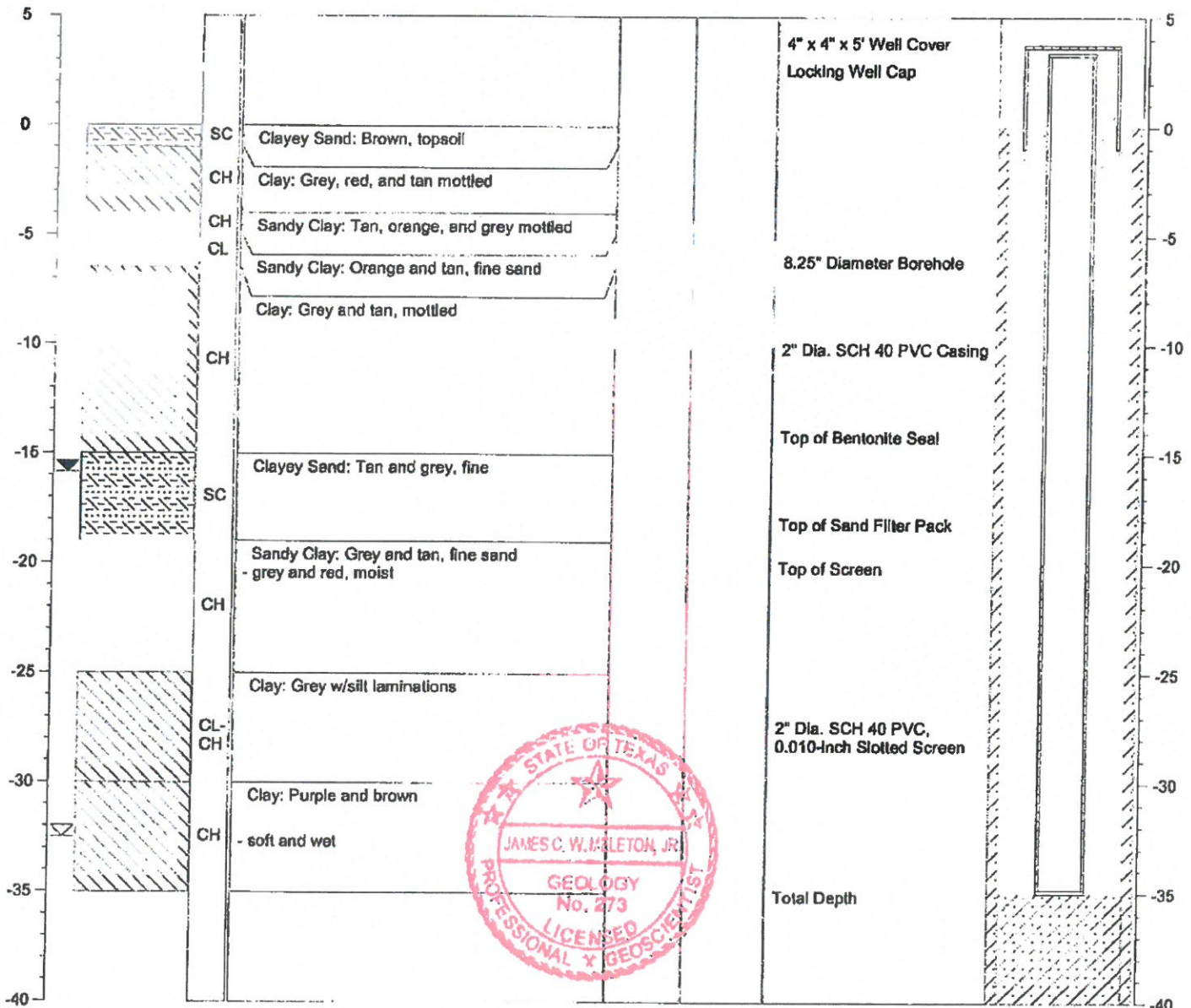
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04881
 Longitude: 94.84047

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-11
 TOTAL DEPTH: 20'
 TOP OF CASING ELEV.: 342.18 ft. NGVD
 GROUND SURFACE ELEV.: 339.61 ft. NGVD

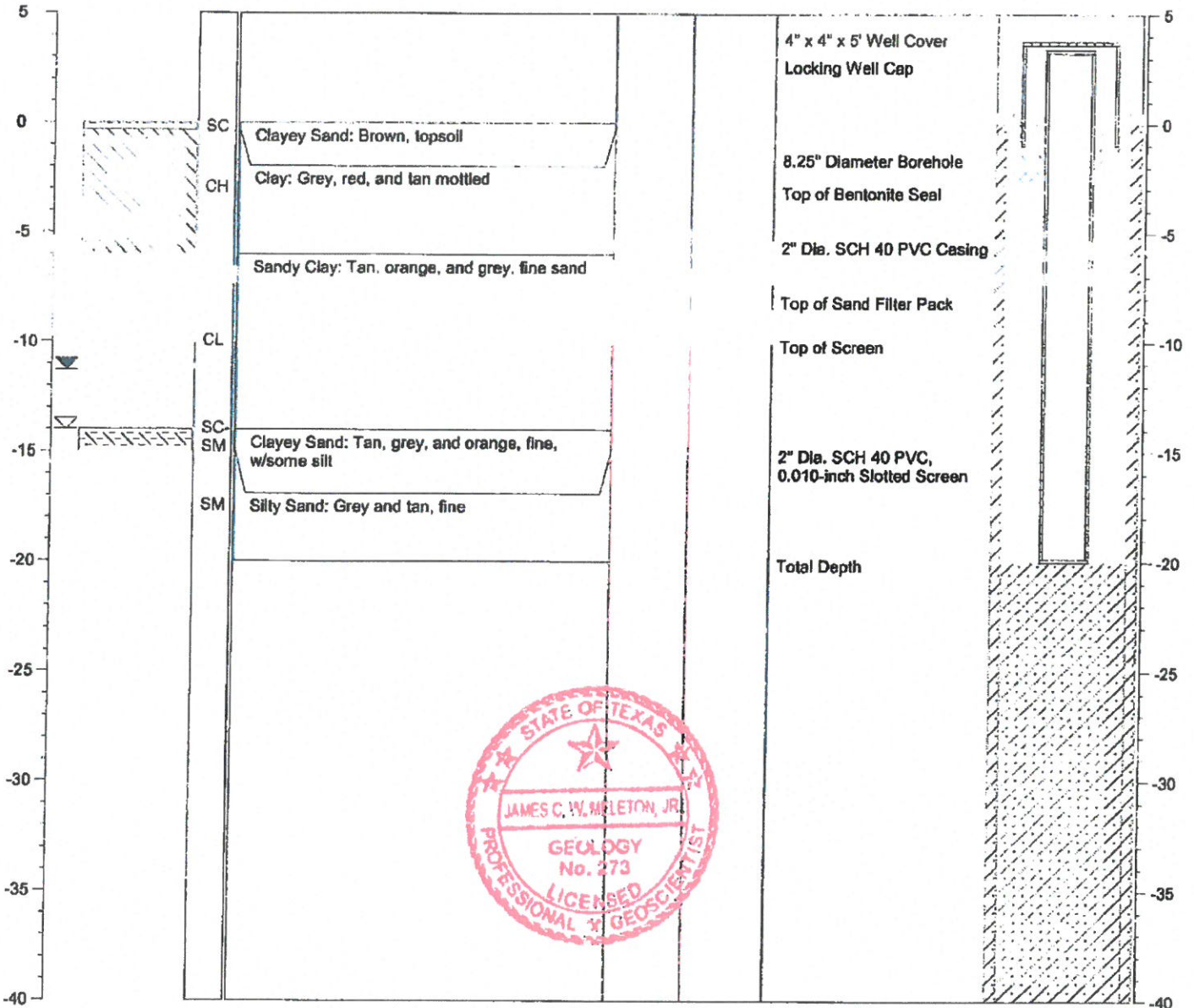
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04824
 Longitude: 94.84177

☒ Water level during drilling
 ☒ Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-12
 TOTAL DEPTH: 30'
 TOP OF CASING ELEV.: 369.33 ft. NGVD
 GROUND SURFACE ELEV.: 366.27 ft. NGVD

CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

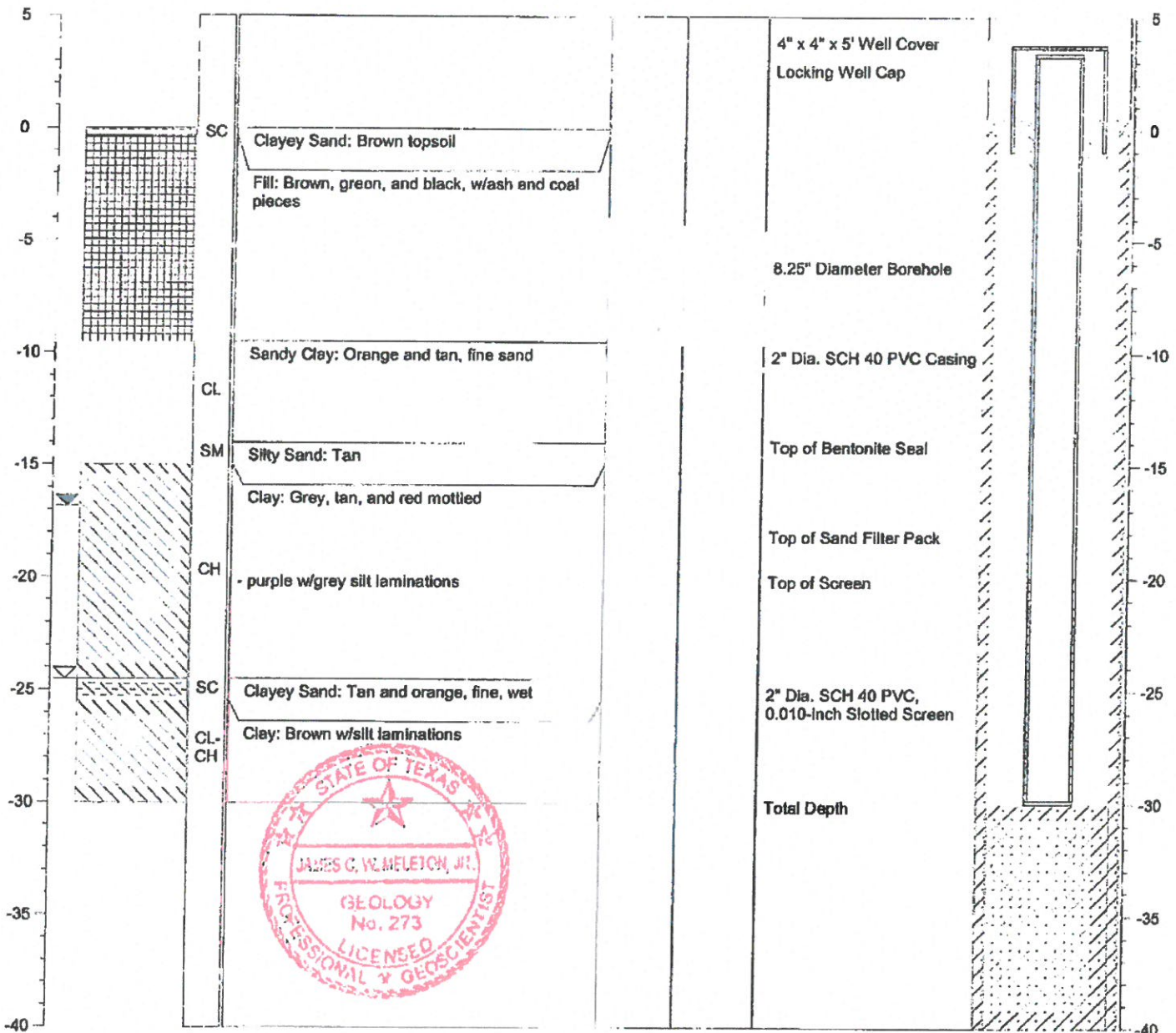
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/24/09

NOTES: Latitude: 33.04901
 Longitude: 94.84977

☒ Water level during drilling
 ☒ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-13
 TOTAL DEPTH: 20'
 TOP OF CASING ELEV.: 347.00 ft. NGVD
 GROUND SURFACE ELEV.: 344.12 ft. NGVD

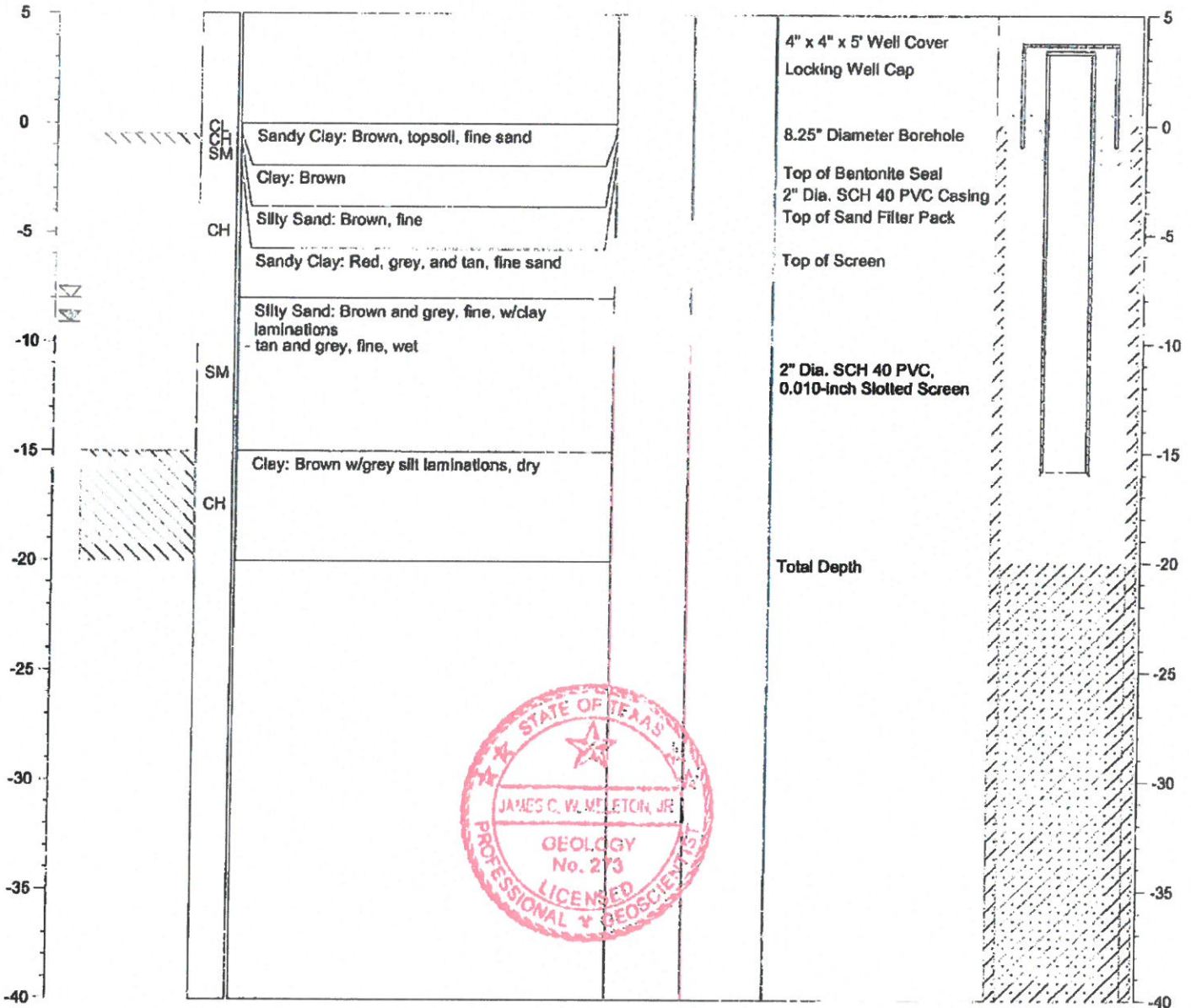
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04918
 Longitude: 94.84275

sz Water level during drilling
 sx Water level in completed well
 Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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SOIL BORING LOG

BORING/WELL NO.: AD-14
 TOTAL DEPTH: 18.5'
 TOP OF CASING ELEV.: 345.43 ft. NGVD
 GROUND SURFACE ELEV.: 342.32 ft. NGVD

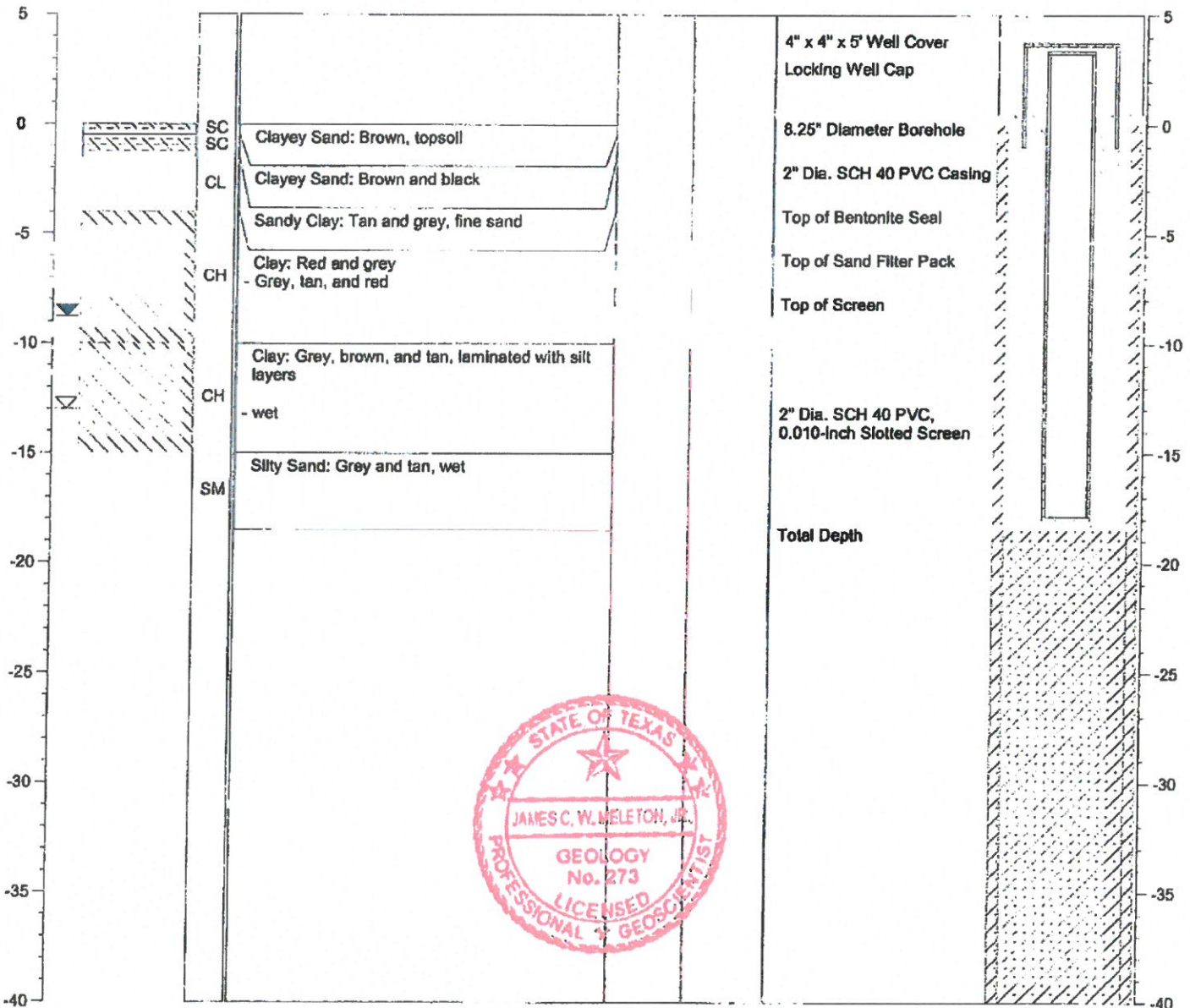
CLIENT: AEP
 PROJECT: Ash Disposal Area
 SITE LOCATION: Welsh Power Plant
 PROJECT NO.: S-08-0109
 LOGGED BY: James Meleton, Jr.

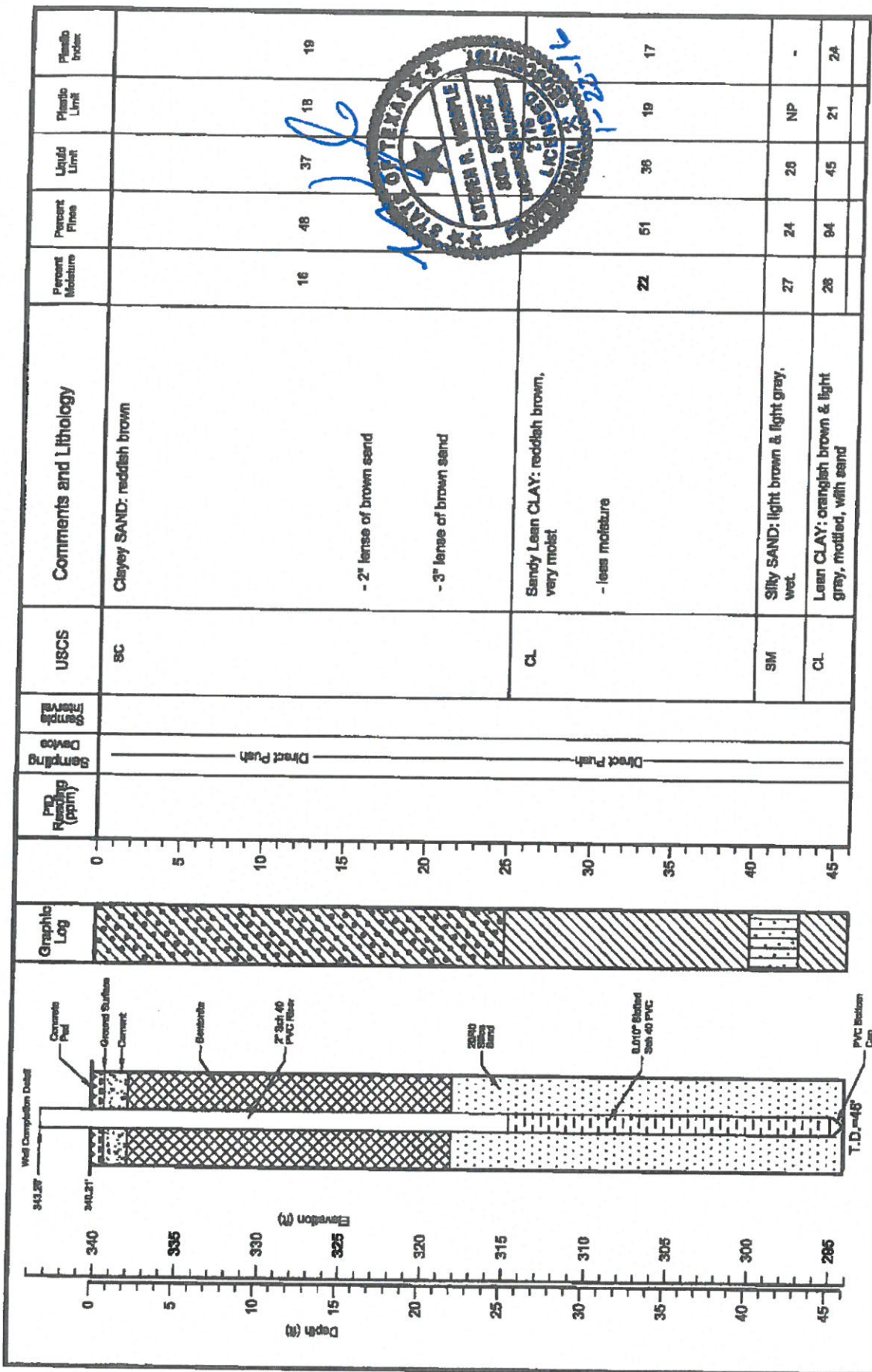
DRILLING CO.: WEST Drilling
 DRILLER: Tom McCullough
 METHOD OF DRILLING: Hollow-stem Auger
 SAMPLING METHODS: Split-spoon
 DATE DRILLED: 9/22/09

NOTES: Latitude: 33.04715
 Longitude: 94.84256

☒ Water level during drilling
 ☒ Water level in completed well

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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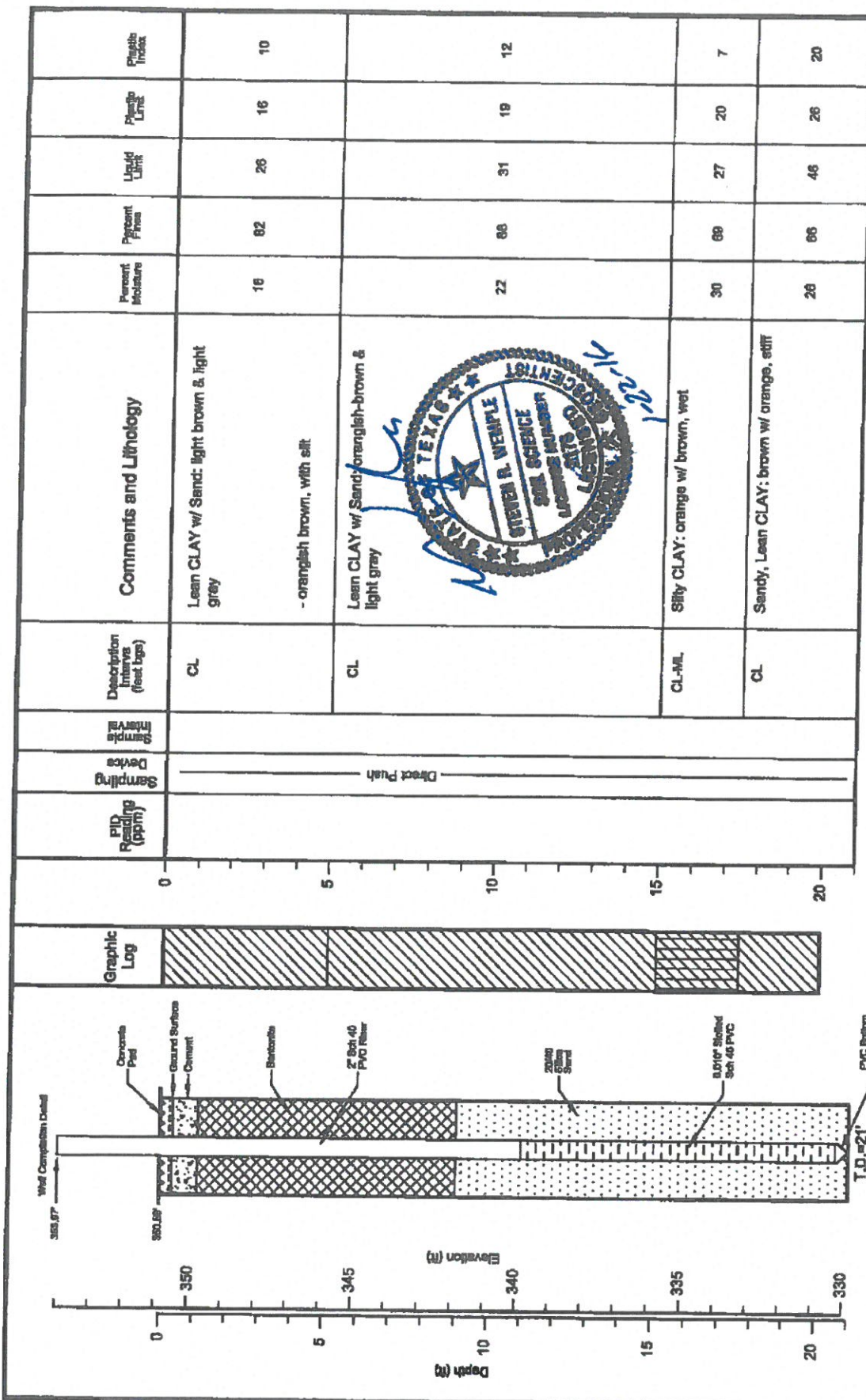
DATE: 12/12/15
 Drilling Method: H.S.A.
 Bit Diameter: 7.25"
 Depth to Water: -

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Data Completed: 12/12/15
 Depth to Product: NA

Welsh Power Station
 Pittsburg, Texas

Log of Boring
 AD-15

DRAWN BY: HDS
 CHECKED BY: SRW
 PROJECT NO.: ---
 SCALE: AS SHOWN
 FILE NAME: AD-15 Welsh Power Plant LOG.dwg



Depth (ft)	Elevation (ft)	Soil Description	Soil Classification	Moisture (%)	Plasticity Index	Plastic Limit (%)	Liquid Limit (%)	Percent Finer	Comments and Lithology
0 - 5	350 - 345	Lean CLAY w/ Sand: light brown & light gray	CL	16	10	16	26	82	Lean CLAY w/ Sand: light brown & light gray
5 - 15	345 - 335	- orangish brown, with silt							
15 - 20	335 - 330	Lean CLAY w/ Sand: orangish-brown & light gray	CL	22	12	19	31	86	Lean CLAY w/ Sand: orangish-brown & light gray
20 - 21	330 - 329	Silty CLAY: orange w/ brown, wet	CL-ML	30	7	20	27	69	Silty CLAY: orange w/ brown, wet
21 - 26	329 - 324	Sandy, Lean CLAY: brown w/ orange, stiff	CL	28	20	26	48	86	Sandy, Lean CLAY: brown w/ orange, stiff



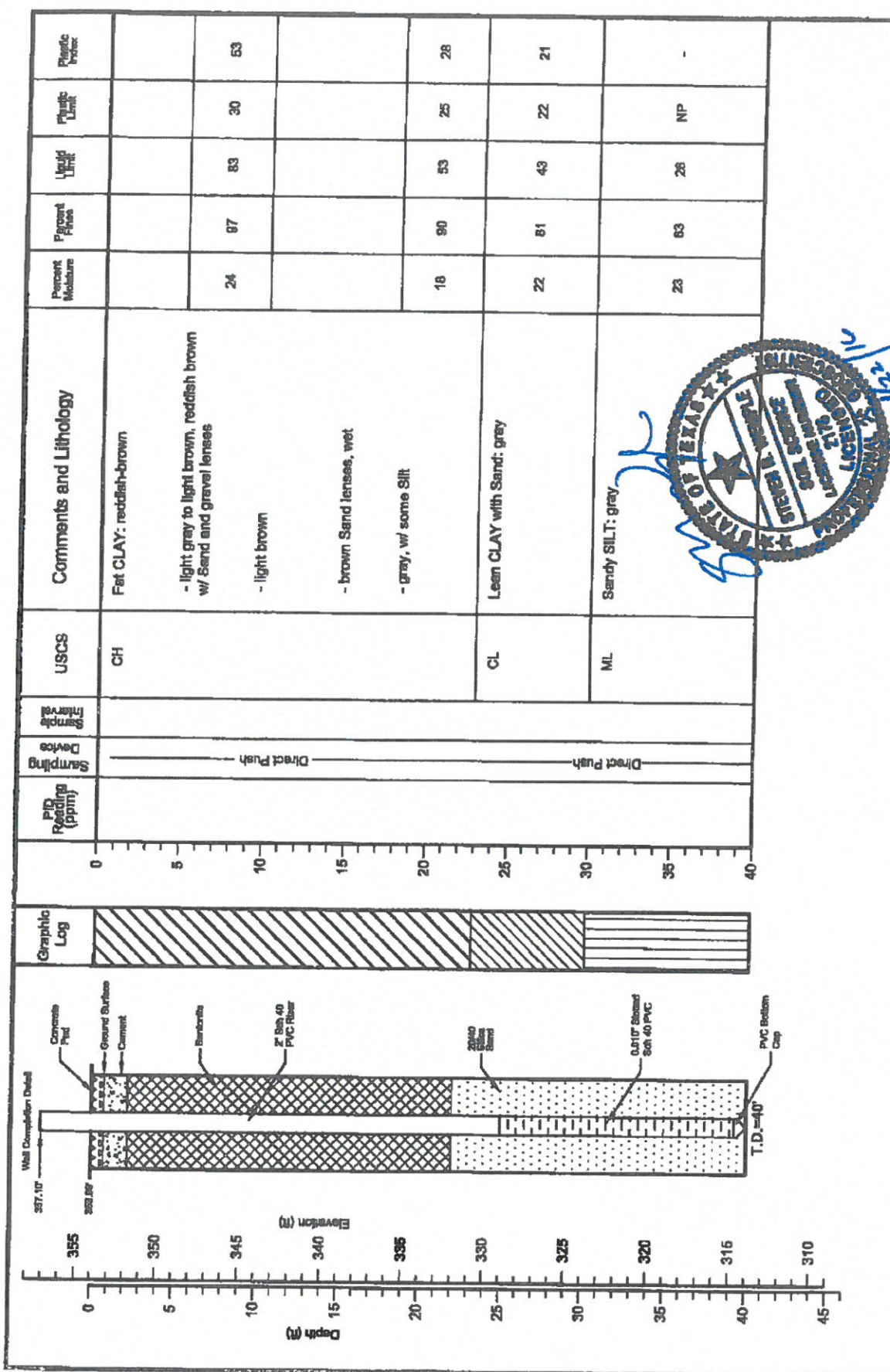
west
DRILLING
 environmental & geotechnical
 WEST Drilling, Inc.
 101 Industrial Drive
 Waco, Texas 76786

DATE: 12/10/15
 Drilling Method: H.S.A.
 BIR Diameter: 7.25"
 Depth to Water: -

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Date Completed: 12/10/15
 Depth to Product: NA

Welsh Power Station
 Pittsburg, Texas
 DRAWN BY: HDS
 CHECKED BY: SRW

Log of Boring
 AD-16
 PROJECT NO.: ---
 SCALE: AS SHOWN
 FILE: 10022-01 Welsh Power Plant LOGS.dwg



Depth (ft)	USCS	Comments and Lithology	Percent Moisture	Plastic Index	Plastic Limit	Liquid Limit
0 - 24	CH	Fat CLAY: reddish-brown - light gray to light brown, reddish brown w/ sand and gravel lenses - light brown	24	87	83	53
24 - 28		- brown sand lenses, wet				
28 - 30		- gray, w/ some silt	18	90	53	25
30 - 31	CL	Lean CLAY with sand: gray				
31 - 35	ML	Sandy SILT: gray	22	81	43	22
35 - 40			23	83	28	NP



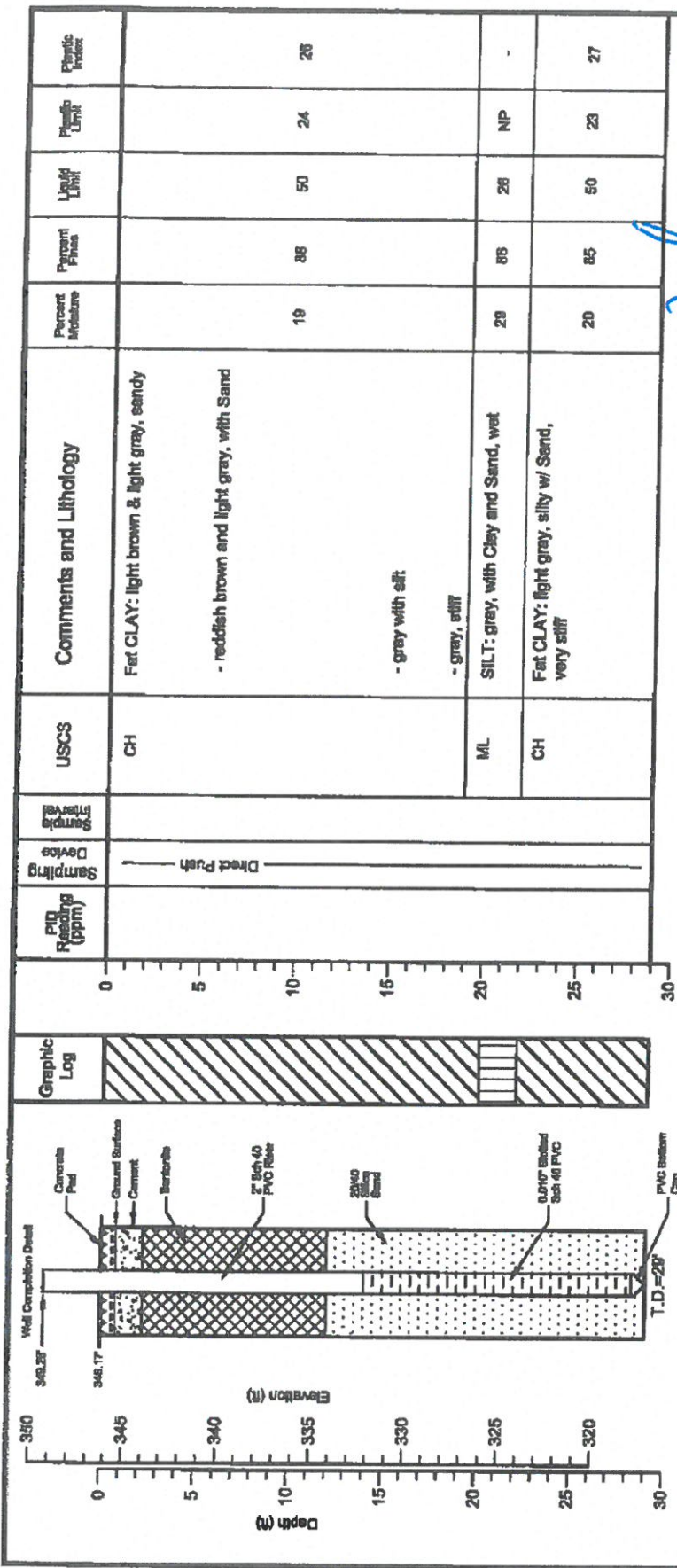
West
DRILLING
 environmental & geotechnical
 WEST Drilling, Inc.
 101 Industrial Drive
 Waco, Texas 76768

DATE: 12/10/15
 Drilling Method: H.S.A.
 Bit Diameter: 7.25"
 Depth to Water: -

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Data Completed: 12/11/15
 Depth to Product: NA

Welsh Power Station
 Pittsburg, Texas
 Log of Boring
 AD-17

PROJECT NO. ---
 SCALE: AS SHOWN
 CHECKED BY: SRW



Depth (ft)	Elevation (ft)	PIV Reading (ppm)	Sampling Device	USCS	Comments and Lithology	Percent Moisture	Percent Plastic	Plastic Limit	Plastic Index
0	346.17		Direct Push	CH	Fat CLAY: light brown & light gray, sandy				
5	340				- reddish brown and light gray, with Sand				
10	335				- gray with silt	19	88	50	26
15	330				- gray, stiff				
20	325			ML	SILT: gray, with Clay and Sand, wet	20	86	26	NP
25	320			CH	Fat CLAY: light gray, silty w/ Sand, very stiff	20	85	50	23
30									27

west
DRILLING
 environmental & geotechnical
 WEST Drilling, Inc.
 101 Industrial Drive
 Waco, Texas 76768

DATE: 12/11/15
 Drilling Method: H.S.A.
 Bit Diameter: 7.25"
 Depth to Water: -

Logged by: Robert Williams, PE
 Driller: Robert Williams
 Date Completed: 12/11/15
 Depth to Product: NA

Weish Power Station
 Pittsburg, Texas
 DRAWN BY: HDS
 CHECKED BY: SRW

Log of Boring
 AD-18
 PROJECT NO. ---
 BOILED AS SHOWN
 FILE NAME: AD-Weish Power Plant LOGS.dwg

Project: AEP Welsh Power Plant
 Project Location: Cason, TX
 Project Number: TXL0064

Log of Boring GB-1
 Sheet 1 of 2

Date(s) Drilled July 23, 2009	Logged By Kush S. Chohan	Checked By
Drilling Method Hollow Stem Auger	Drill Bit Size/Type	Total Depth of Borehole 37 feet bgs
Drill Rig Type Mobil B61	Drilling Contractor Total Support Services	Approximate Surface Elevation 367 feet MSL
Groundwater Level and Date Measured	Sampling Method(s) SPT, Tube	Hammer Data 140 lb, 30 in drop, Auto-hammer
Borehole Backfill Bentonite Chips	Location On the Northern edge of proposed chemical pond along the screening berm.	

Printed with a trial version of Borin.GS - visit www.gpokinsoftware.com for purchase information: P:\Projects\AEP Welsh Plant\2009 Pond Design\Hydrogeo Investigation\Boring Log\Boring GS files\GB-1.bgs [KSC AEP.lpd]

Elevation, feet	Depth, feet	Sample Type	Sample Description	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
367	0	ST		Other		Black COAL, a few fine roots and organics.						Shelby tube pulled black COAL
	5	SS	10	Soft to Firm	SC	Reddish Brown fine SAND, little clay, trace silt, Dry. Natural Ground.						SPT 4, 5, 5, 5, 24" recovered
	10	SS	11	Soft	SM	Reddish brown fine SAND with silt, trace clay. Vertical sand seams in sample, Dry.						SPT 3, 5, 6, 8, 24" recovered.
	15	SS	11	Soft	SM	Reddish brown fine SAND with silt, trace clay. Vertical sand seams in sample, Dry.						SPT 3, 5, 6, 8, 24" recovered.
357	10	ST		Other			23.6	25	48.9	5.4E-07		Shelby tube sample, 16" recovered.
	12	SS	12	Firm	CL	Greyish red CLAY, little sand, horizontal sand seams, Dry.						SPT 5, 6, 8, 9, 24" recovered
	13	SS	13	Firm	SC-CL	Brownish red fine SAND, little clay, Damp.						SPT 7, 6, 7, 8, 24" recovered.
	14	SS	13	Firm	CL	Four-inch CLAY seam, little fine sand.						
	15	SS	13	Firm	CL	Reddish grey CLAY, little sand, oxidized iron ore. Dry						SPT 8, 9, 9, 8, 24" recovered.
	16	SS	16	Soft	SM	Brownish red fine SAND, trace clay, thin clay seams. Moist.	17.74	14	40.1			SPT 8, 9, 9, 8, 24" recovered.
	20	SS	17	Soft	Other	Iron oxidized material	16.25	NP	28.9	3.8E-05		Shelby tube sample, lock like SC. 17" recovered.
	21	SS	15	Soft	SC	Brownish red fine SAND, little clay. Moist.						SPT 5, 7, 8, 50/2, 21" recovered
	22	SS	18	Soft Very Hard	CL SP	Dark grey CLAY, little fine sand, Wet.						SPT 50/3"
	23	SS	18	Soft Very Hard	CL SP	Dark grey-black cemented SAND, little clay. Wet. Driller comments that cemented sand terminates at 25.5 feet.						
342	25	SS	27	Soft to Firm	SC	Dark grey fine SAND, little clay. Moist. Soft sand with lenses of firm clay.						SPT 11, 13, 14, 16, 24" recovered.
	26	SS	46	Firm Hard Soft	CL SC	Dark grey CLAY, little sand, Dry.						SPT 11, 16, 30, 14, 24" recovered.
	27	SS	46	Firm Hard Soft	CL SC	Dark grey-black fine SAND, little clay, Wet. Encountered water but water rose to 19 feet after 15 min break.						SPT 11, 15, 22, 25, 24" recovered.
337	30	SS	37	Hard	CL							

Figure

Project: AEP Welsh Power Plant

Project Location: Cason, TX

Project Number: TXL0064

Log of Boring GB-1

Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, lb/sq.foot	Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
337	30	SS	37	Hard	CL		Dark grey CLAY, little fine sand, occasional horizontal sand seams. Wet. (cont.)						SPT 11, 15, 22, 25. 24' recovered.
		SS	29	Soft	ML		Dark grey-black fine SAND, with clay, frequent hard clay lenses (1-3"). Wet.	26.37	NP	57.5			SPT 6, 11, 15, 24. 24' recovered.
332	35	SS	34	Hard	CL		Black CLAY, trace to little fine sand, trace silt. Dry						SPT 9, 16, 18, 23. 24' recovered.
		Bottom of Boring at 37 feet bgs											
327	40												
322	45												
317	50												
312	55												
307	60												
302	65												

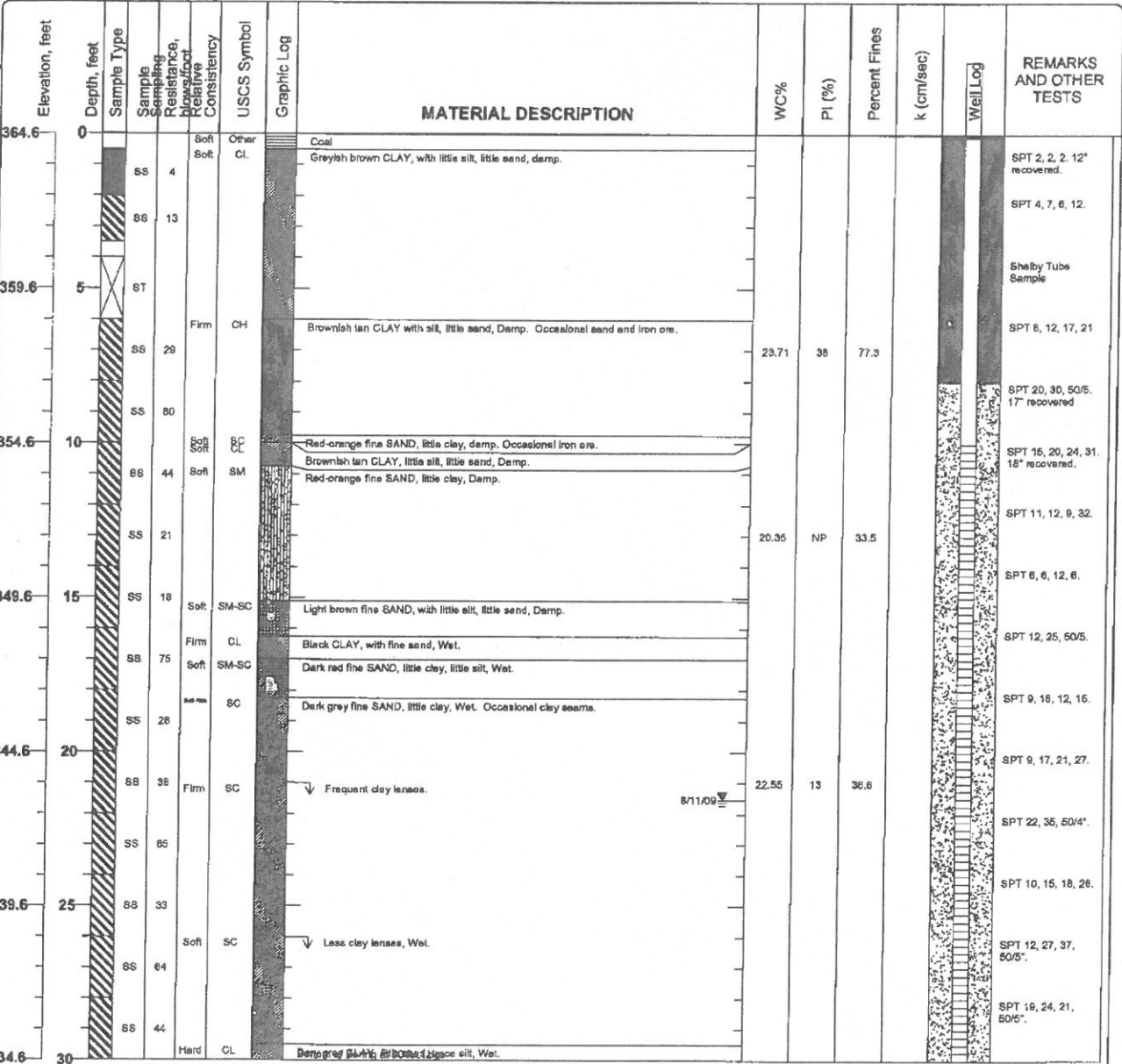
Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-02
 Sheet 1 of 1

Date(s) Drilled	August 14, 2009	Logged By	Kush S. Chohan	Checked By	
Drilling Method	Hollow Stem Auger	Drill Bit Size/Type		Total Depth of Borehole	30 feet bgs
Drill Rig Type	Mobil B61	Drilling Contractor	Total Support Services	Approximate Surface Elevation	364.56 feet MSL
Groundwater Level and Date Measured	21.53 feet measured on 8/11/09	Sampling Method(s)	SPT, Tube	Hammer Data	140 lb, 30 in drop, rope & cathead
Borehole Backfill	Well Completion	Location	Western edge of proposed chemical pond near perimeter fence.		

Printed with a trial version of BorinGS - visit www.gpoinfsoftware.com for purchase information: P:\Projects\AEP-Welsh Plant\2009 Pond Design\Hydrogec Investigation\Boring Log\Boring_GS_files\GB-02_bgs [KSC AEP].dpl



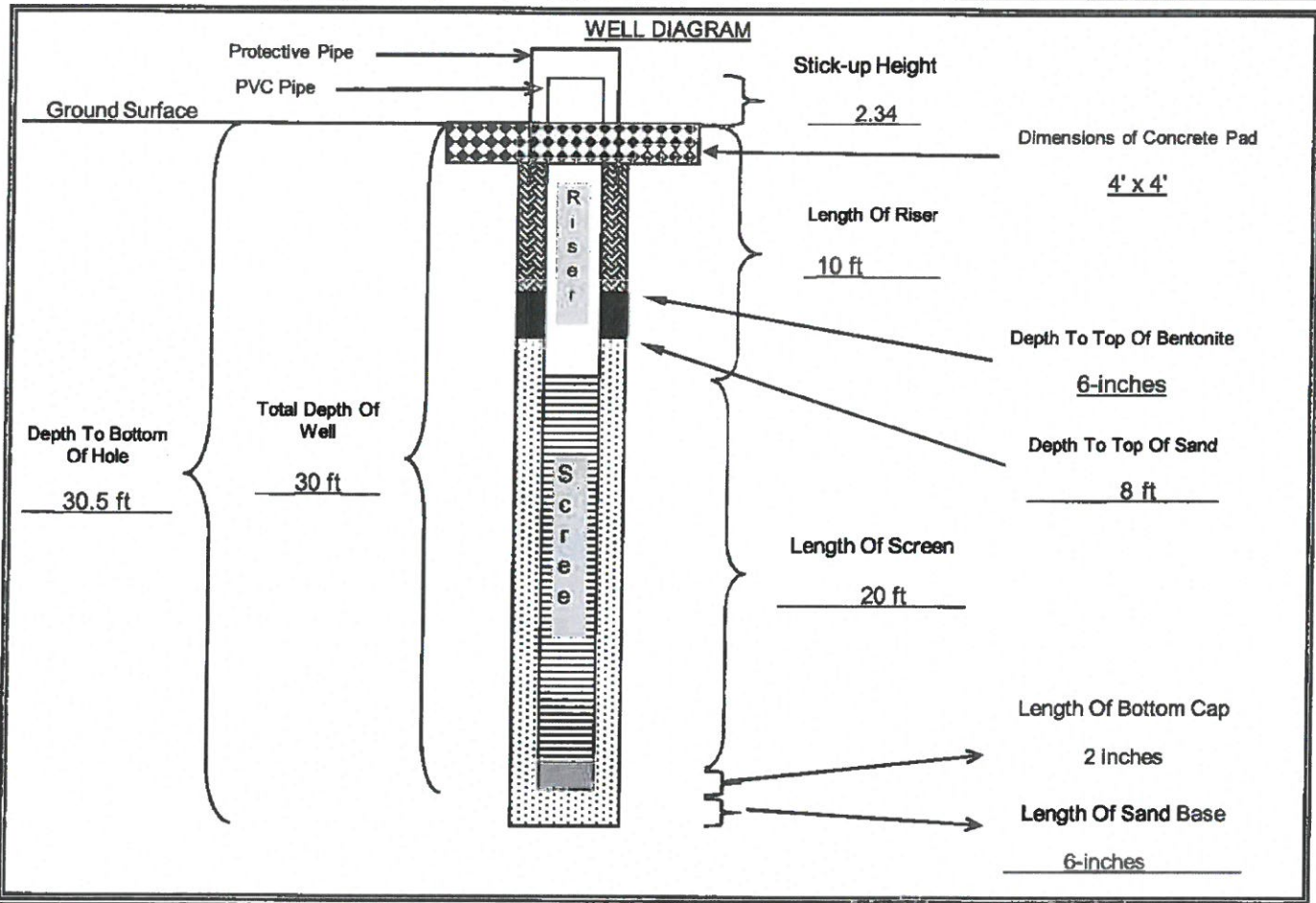
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-02
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>8/7/2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>364.56</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>354.56</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>334.06</u> (ft, msl)	CEMENT TYPE: <u>Not used-sealed with bentonite chips</u>
NORTHING: <u>747.0223</u> EASTING: <u>-2442.888</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>4</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>13</u> bags lbs
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>21.53</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow stem</u> Size: _____ (in)	ENCOUNTERED WATER: _____ depth from ground



Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

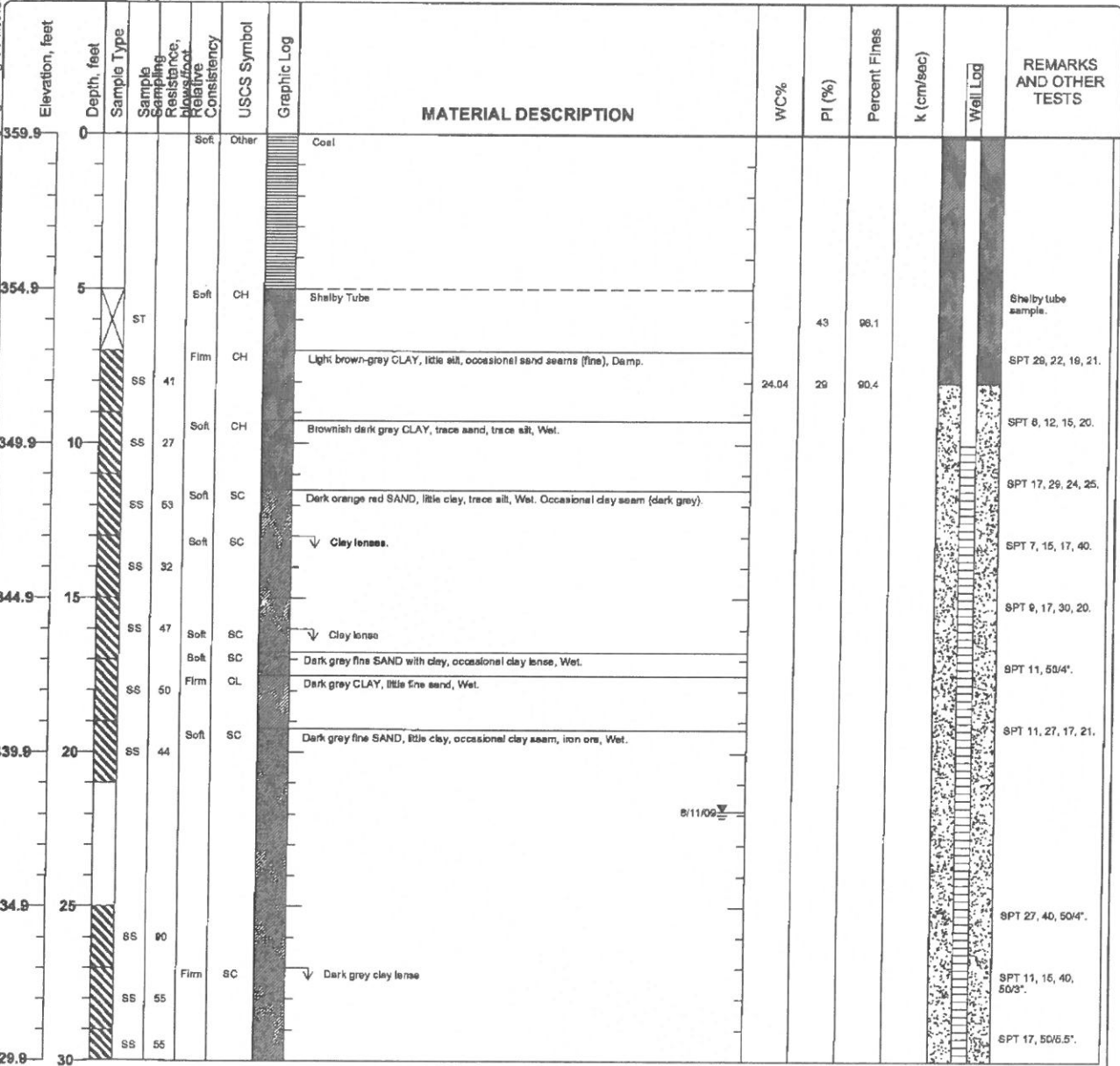
QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>
	DATE: <u>August 7th, 2009</u>	CHECKED BY: _____ DATE: _____

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-03
 Sheet 1 of 2

Date(s) Drilled August 7, 2009	Logged By Kush S. Chohan	Checked By
Drilling Method Hollow Stem Auger	Drill Bit Size/Type	Total Depth of Borehole 31 feet bgs
Drill Rig Type Mobil B61	Drilling Contractor Total Support Services	Approximate Surface Elevation 359.91 feet MSL
Groundwater Level and Date Measured 21.89 feet measured on 8/11/09	Sampling Method(s) SPT, Tube	Hammer Data 140 lb, 30 in drop, rope & cathead
Borehole Backfill Well Completion	Location Southwest corner of proposed chemical pond near screening pile.	

Printed with a trial version of BorinGS - visit www.gookrisoftware.com for purchase information: P:\Projects\AEP Welsh Plant\2009 Pond Design\Hydrogeo Investigation\Boring_Log\Boring_GS_files\GB-03.bgs (KSC AEP.tpl)



Figure

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-03
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
329.9	30	SS	85	Hard CL	[Symbol]	Dark gray CLAY, trace silt, trace fine sand.						SPT 17, 60/6.5'
						Bottom of Boring at 31 feet bgs						
324.9	35											
319.9	40											
314.9	45											
309.9	50											
304.9	55											
299.9	60											
294.9	65											

Printed with a trial version of Borings - v3.01 www.gookinschwam.com for purchase information: P:\Projects\AEP Welsh Plant\2009 Pond Design\Hydrogao Investigation\Boring
 Log\Boring_SS_Boring_GB-03_bgs_KSC-AEP.jpg

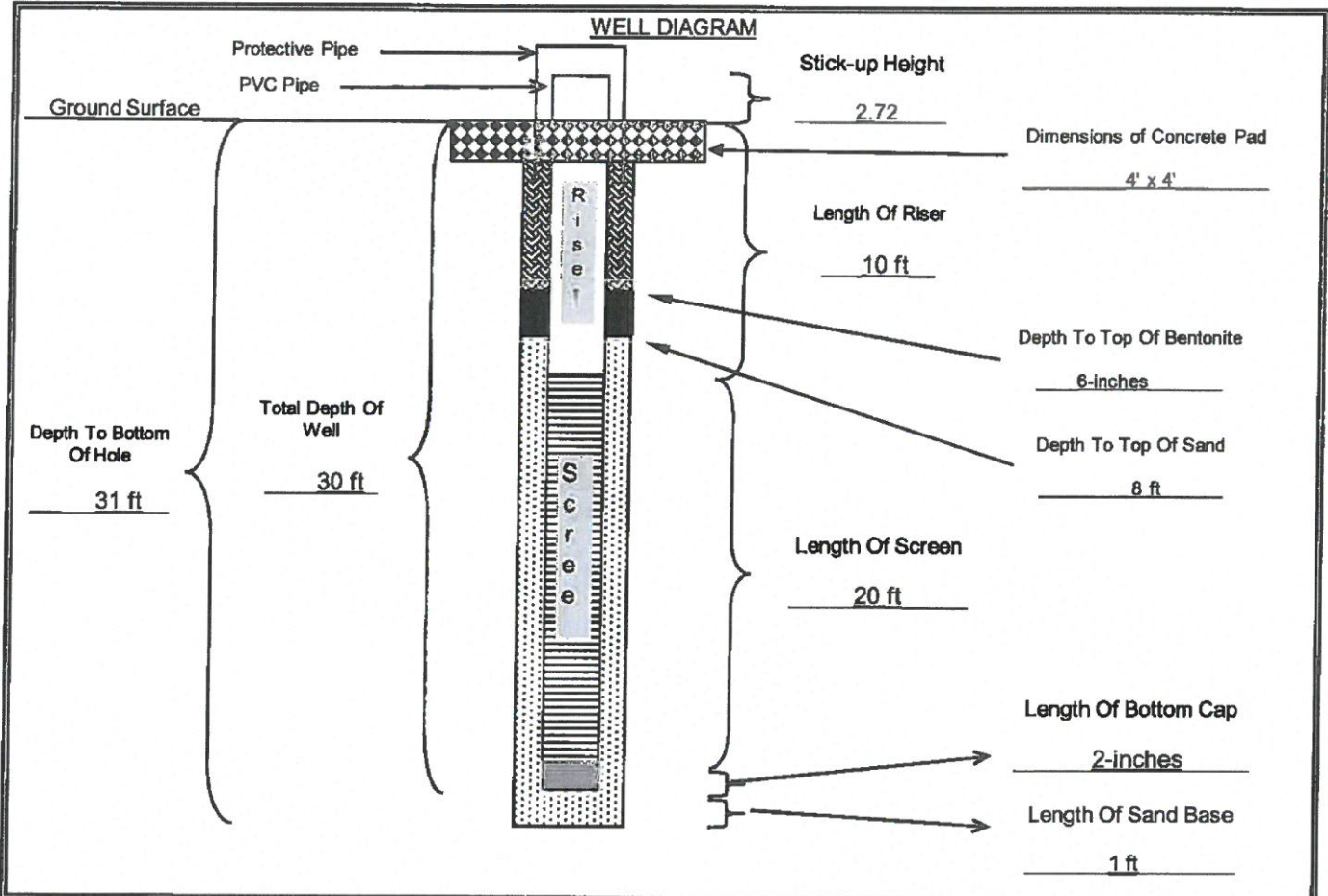
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-03
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>8/7/2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>359.57</u> (ft. msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>349.57</u> (ft. msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>328.57</u> (ft. msl)	CEMENT TYPE: <u>None used-sealed with bentonite chips</u>
NORTHING: <u>460.5803</u> EASTING: <u>-2507.6332</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>4</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>12</u> bags lbs
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>21.89</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>8</u> (in)	ENCOUNTERED WATER: _____ depth from ground



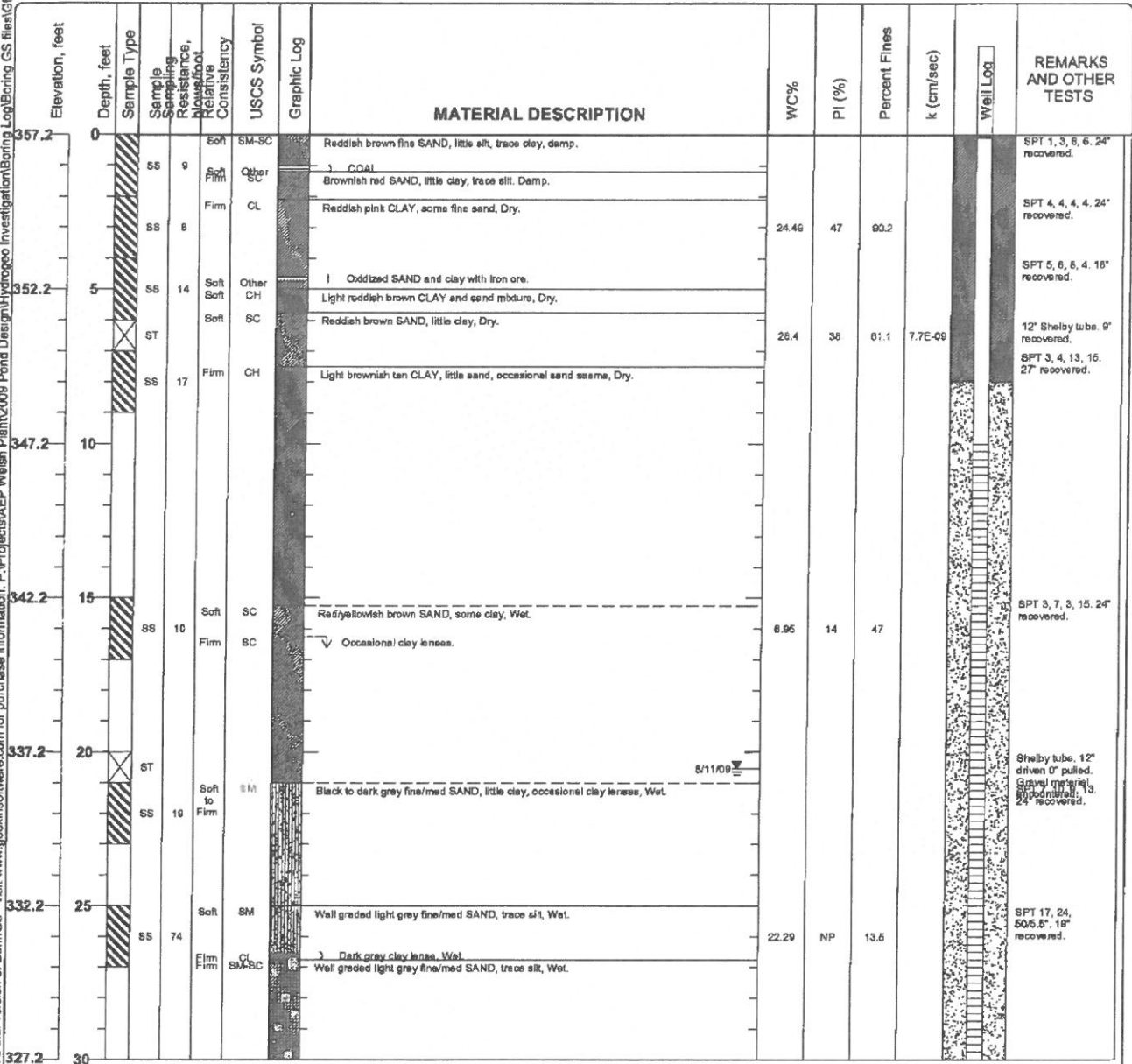
Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush S. Chohan</u>
	DATE: <u>7-Aug-09</u>	CHECKED BY: _____ DATE: _____

Project: AEP Welsh Power Plant
Project Location: Cason, Texas
Project Number: TXL0064

Log of Boring GB-04
 Sheet 1 of 2

Date(s) Drilled July 24, 2009	Logged By Kush S. Chohan	Checked By
Drilling Method Hollow Stem Auger	Drill Bit Size/Type	Total Depth of Borehole 34 feet bgs
Drill Rig Type Mobil B61	Drilling Contractor Total Support Services	Approximate Surface Elevation 357.22 feet MSL
Groundwater Level and Date Measured 20.54 feet measured on 8/11/09	Sampling Method(s) SPT, Tube	Hammer Data 140 lb, 30 in drop, Auto-hammer
Borehole Backfill Well Completion	Location Southeast corner of proposed chemical evaporation pond. Located in a grassy field.	



Figure

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Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-04
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, Penetration Resistance Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
327.2	30	ST	Hard	ML		Dark gray CLAY, little sand, Wet.						
		ST					21.3	NP	84.2	2.0E-08		12" Shelby tube. Bent shalby tube.
		SS	Hard	CL		Dark gray CLAY, trace sand, Wet.	25.44	18	82.5			12" Shelby tube. SPT 15, 16, 19, 25, 24" recovered.
						Bottom of Boring at 34 feet bgs						
322.2	35											
317.2	40											
312.2	45											
307.2	50											
302.2	55											
297.2	60											
292.2	65											

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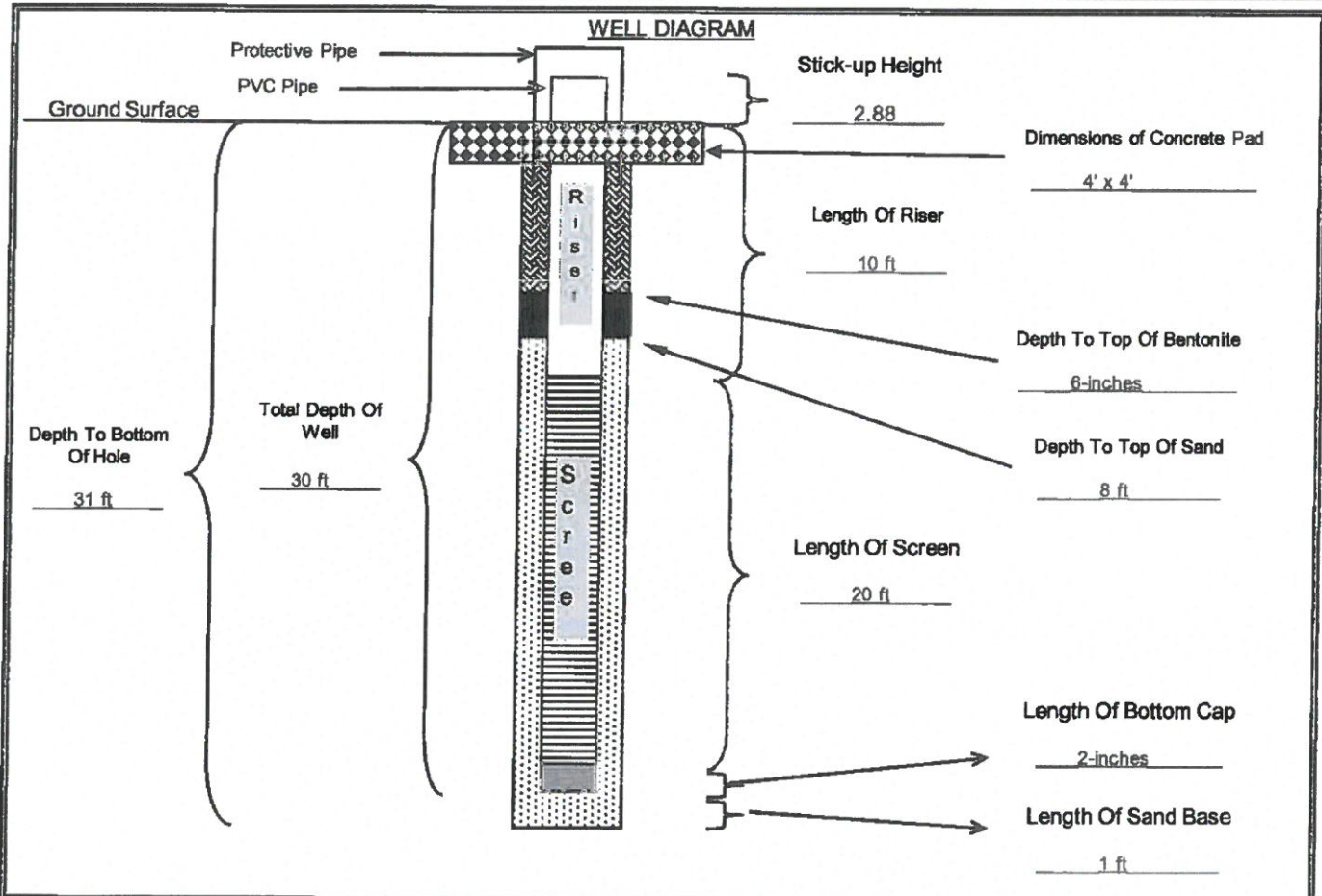
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-04
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>24-Jul-09</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.22</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>347.22</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>326.22</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>-384.9666</u> EASTING: <u>-2353.7375</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>3</u> bags <u>lbs</u>
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags <u>lbs</u>
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>7</u> bags <u>lbs</u>
BOREHOLE DIAMETER: _____ (in)	STATIC WATER: <u>20.54</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>6.75</u> (in)	ENCOUNTERED WATER: _____ depth from ground



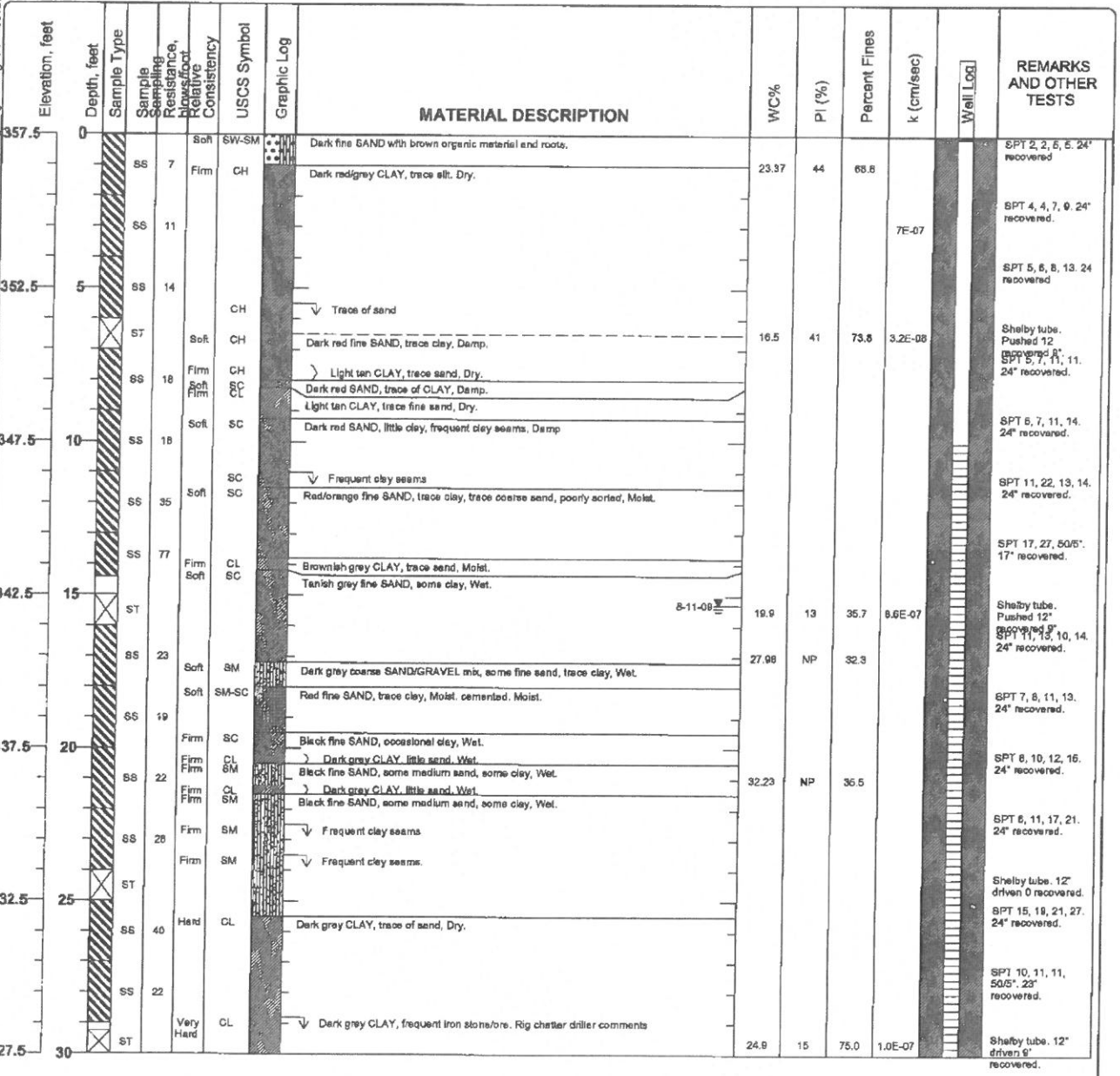
Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush S. Chohan</u>
	DATE: <u>24-Jul-09</u>	CHECKED BY: _____ DATE: _____

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-05
 Sheet 1 of 2

Date(s) Drilled July 24, 2009	Logged By Kush S. Chohan	Checked By
Drilling Method Hollow Stem Auger	Drill Bit Size/Type	Total Depth of Borehole 30.5 feet bgs
Drill Rig Type Mobil B61	Drilling Contractor Total Support Services	Approximate Surface Elevation 357.49 feet MSL
Groundwater Level and Date Measured 15.3 feet measured on 8-11-09	Sampling Method(s) SPT, Tube	Hammer Data 140 lb, 30 in drop, Auto-hammer
Borehole Backfill Well Completion	Location Eastern edge of proposed chemical evaporation pond.	



Figure

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Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-05
 Sheet 2 of 2

Elevation, feet	Depth, feet	Sample Type	Sample Sampling Resistance, Blowcount Relative Consistency	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
327.5	30	ST	Hard	CL		Dark grey CLAY, trace of sand, Dry. (cont.) Bottom of Boring at 30.6 feet bgs	24.0	15	75.0	1.0E-07		Shelby tube, 12" driven 9" recovered.
322.5	35											
317.5	40											
312.5	45											
307.5	50											
302.5	55											
297.5	60											
292.5	65											

Figure

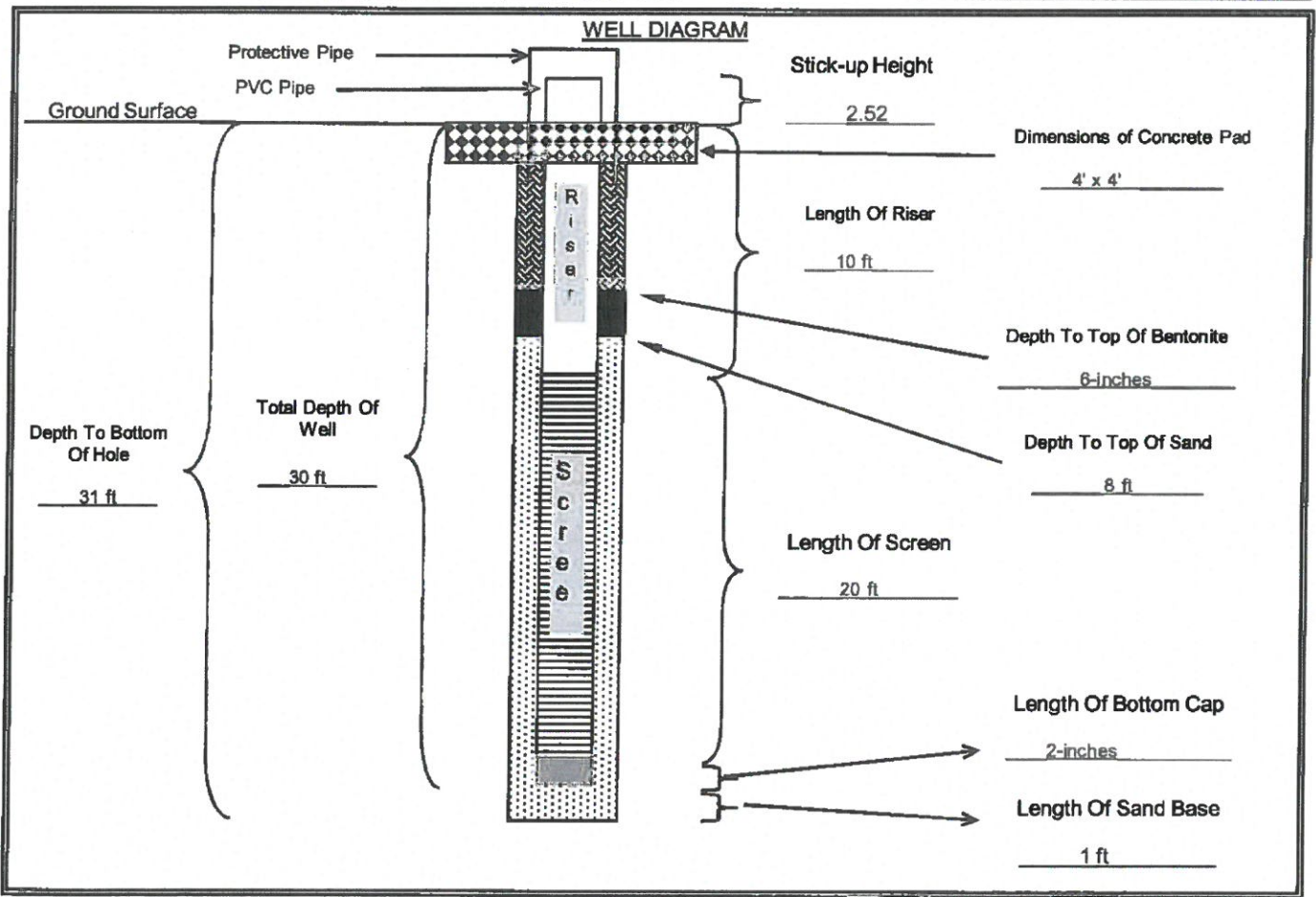
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WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-05
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>August 6 2009</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.49</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>347.49</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>326.49</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>529.1865</u> EASTING: <u>-2243.9973</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>3</u> bags <u>lbs</u>
RISER DIAMETER: <u>2</u> (in) Length: <u>10</u> (ft)	AMOUNT CEMENT USED: _____ bags <u>lbs</u>
SCREEN DIAMETER: <u>2</u> (in) Length: <u>20</u> (ft)	AMOUNT SAND USED: <u>7</u> bags <u>lbs</u>
BOREHOLE DIAMETER: <u>8</u> (in)	STATIC WATER: <u>17.33</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>8</u> (in)	ENCOUNTERED WATER: _____ depth from ground



QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>		
	DATE: <u>6-Aug-09</u>	CHECKED BY: _____	DATE: _____	

Project: AEP Welsh Power Plant
 Project Location: Cason, Texas
 Project Number: TXL0064

Log of Boring GB-06
 Sheet 1 of 1

Date(s) Drilled 7/23/2009	Logged By Kush S. Chohan	Checked By
Drilling Method Hollow Stem Auger	Drill Bit Size/Type	Total Depth of Borehole 30 feet bgs
Drill Rig Type Mobil B61	Drilling Contractor Total Support Services	Approximate Surface Elevation 357.41 feet MSL
Groundwater Level and Date Measured 15.3 feet measured on 8/11/09	Sampling Method(s) SPT, Tube, Other	Hammer Data 140 lb, 30 in drop, auto hammer
Borehole Backfill Well Completion	Location Northeast corner of proposed chemical pond in the middle of open grass field.	

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Elevation, feet	Depth, feet	Sample Type	Sample Description	USCS Symbol	Graphic Log	MATERIAL DESCRIPTION	WC%	PI (%)	Percent Fines	k (cm/sec)	Well Log	REMARKS AND OTHER TESTS
357.4	0	HA		SP		Greyish brown fine SAND with trace fines. Organic material (roots).						Hand Auger
		SS	14	SP-SM		Greyish red fine SAND, little silt. Poorly sorted, less organic material.						
		SS		SM		Greyish red fine SAND, with little silt and clay. Dry.						
		SS		CL		Tanish grey fine SAND, trace silt and clay, frequent iron oxide, frequent discoloration.	12.74	34	87.9			SPT 4, 7, 7, 16" recovered
352.4	5	SS	11	CL		Red light brown CLAY, little sand, trace silt, Dry.						
		SS		SC		Dark reddish brown fine SAND, little clay.						
		SS	12	CL		Light grey CLAY, little sand, trace silt. Dry.						
		SS		SC		Reddish brown fine SAND, trace clay, trace silt. Occasional clay seams. Damp.	17.66	NP	43.2			SPT 3, 5, 6, 8, 20" recovered
		SS		CL		Light grey CLAY, little fine sand.						
347.4	10	SS	19	SC		Brownish red fine SAND, little to some clay, some cementation. Damp.						
		SS		CL		Brown CLAY, little fine sand, frequent brown sand-clay mixture with iron ore oxide.						
		SS	40	CL		Dark reddish brown CLAY, little fine sand, Damp.	22.9	21	43.2	6.0e-07		SPT 3, 5, 7, 7, 24" recovered
342.4	15	SS	22	SC		Dark reddish brown SAND, little to some clay. Moist.						
		SS		CL		Black CLAY, little fine sand, Wet.						
		SS	30	SW		Black fine SAND, trace clay, trace med sand, Wet.						SPT 8, 9, 10, 10, 24" recovered
		SS		SC		Black CLAY, trace fine sand, trace silt, Wet.						
337.4	20	SS	34	CL		Black fine SAND, little clay, Wet.						
		SS		SC		Black CLAY, trace sand, trace silt, Wet.						
		SS	36	SC		Black fine SAND, trace to little clay, Wet. Occasional black clay seams.						
		SS		SP-SC		Black fine SAND, with little clay, trace med sand, Wet.						
		SS	40	SW-SC		Grading to med SAND, Wet.						
332.4	25	SS	23	SW-SC		Occasional CLAY lenses, Wet.						
		SS		SC		Black fine SAND, little med sand and clay, Wet.						
		SS	40	CL		Dark grey CLAY, little sand, little silt, Dry.						
327.4	30	ST				Bottom of Boring at 30 feet bgs	19	45.1				SPT 5, 5, 22, 50" 22 recovered
												SPT 2, 8, 14, 10, 24" recovered
												SPT 10, 11, 23, 33, 24" recovered
												SPT 11, 16, 16, 24, 24" recovered
												SPT 9, 11, 12, 22, 24" recovered
												Shelby Tube, 24" driven/16" recovered
												Shelby Tube, 12" driven/8" recovered

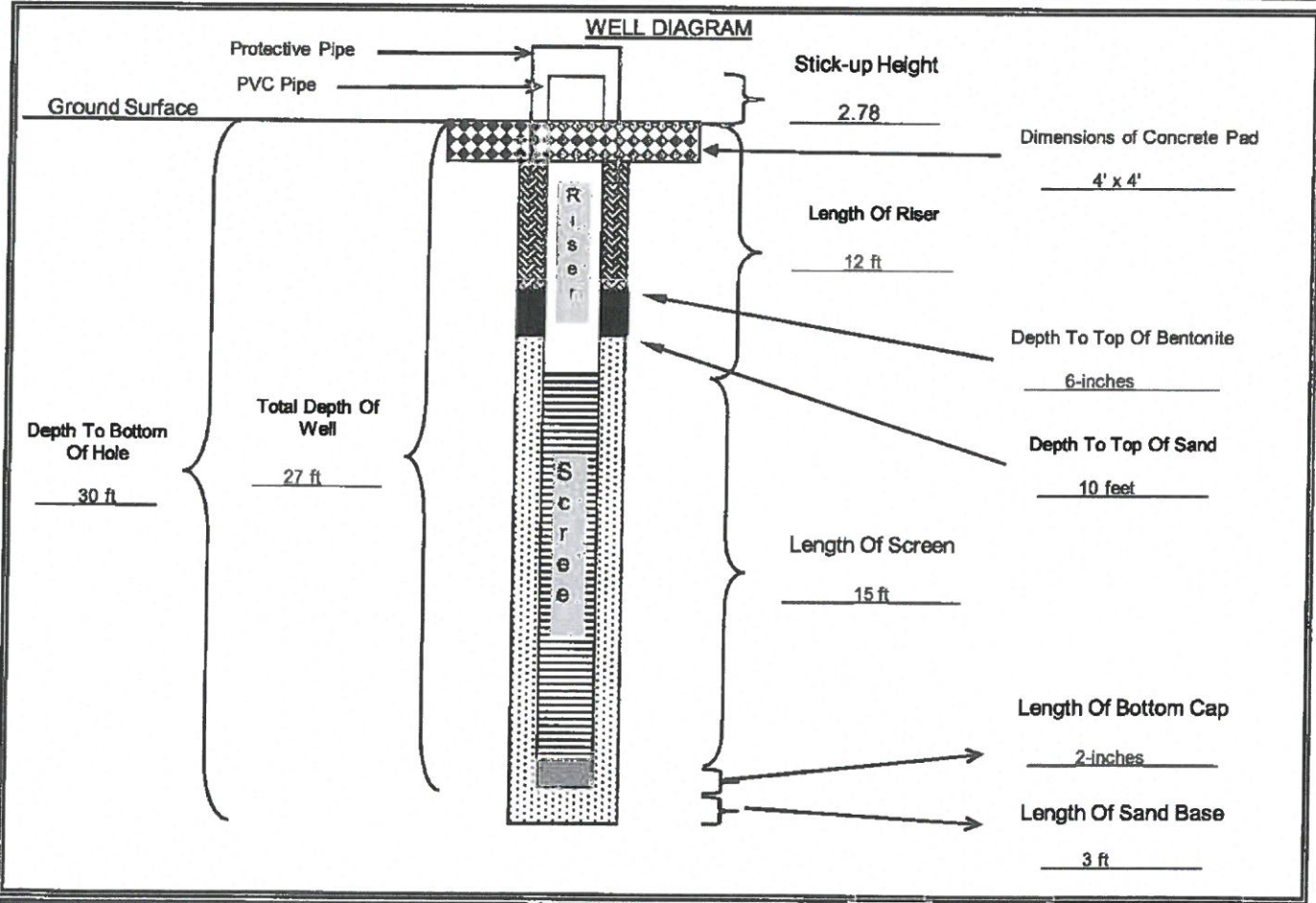
Figure

WELL CONSTRUCTION DIAGRAM - EPA TYPE II WELL (STICK-UP)



JOB NAME: <u>AEP Welsh Power Plant</u>	GB-06
JOB NO.: <u>TXL0064</u>	
DATE/TIME: <u>23-Jul-09</u>	WELL NO.:
WELL LOCATION:	FIELD REP: <u>Kush Chohan</u>

GROUND SURFACE ELEVATION: <u>357.41</u> (ft, msl)	BENTONITE TYPE: <u>Western Bentonite</u>
TOP OF SCREEN ELEVATION: <u>345.41</u> (ft, msl)	MANUFACTURER: <u>PDS</u>
BOTTOM OF WELL ELEVATION: <u>327.41</u> (ft, msl)	CEMENT TYPE: _____
NORTHING: <u>740.4893</u> EASTING: <u>-2166.134</u>	CEMENT MANUFACTURER: _____
SCREEN MATERIAL: <u>PVC</u>	SAND PACK TYPE AND SIZE: <u>Silica 20/40</u>
SCREEN MANUFACTURER: _____	SAND MANUFACTURER: <u>Uninum</u>
RISER MATERIAL: <u>PVC</u>	DRILLING CONTRACTOR: <u>Total Support Services</u>
RISER MANUFACTURER: _____	AMOUNT BENTONITE USED: <u>2.5</u> bags lbs
RISER DIAMETER: <u>2</u> (in) Length: <u>12</u> (ft)	AMOUNT CEMENT USED: _____ bags lbs
SCREEN DIAMETER: <u>2</u> (in) Length: <u>15</u> (ft)	AMOUNT SAND USED: <u>7</u> bags lbs
BOREHOLE DIAMETER: _____ (in)	STATIC WATER: <u>15.3</u> depth from TOC
DRILLING TECHNIQUE: <u>Hollow Stem</u> Size: <u>6.75</u> (in)	ENCOUNTERED WATER: _____ depth from ground



Cement/Bentonite Grout	Sand Pack	Neat Concrete	Bentonite	Bottom Cap

QA/QC	INSTALLED BY: <u>Total Support Services</u>	OBSERVED BY: <u>Kush Chohan</u>
	DATE: <u>23-Jul-09</u>	CHECKED BY: _____ DATE: _____



SOIL BORING LOG

BORING/WELL NO.: **GB-07/MW-7**
 TOTAL DEPTH: **34'**
 TOP OF CASING ELEV.: **362.75 ft. NGVD**
 GROUND SURFACE ELEV.: **360.20 ft. NGVD**

CLIENT: **AEP**
 PROJECT: **Metal Cleaning Waste Pond**
 SITE LOCATION: **Welsh Power Plant**
 PROJECT NO.: **S-08-0120**
 LOGGED BY: **James Meleton, Jr.**

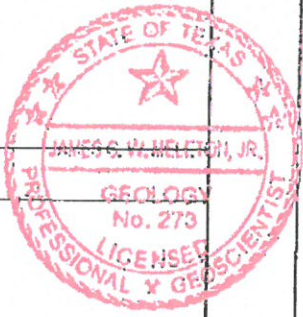
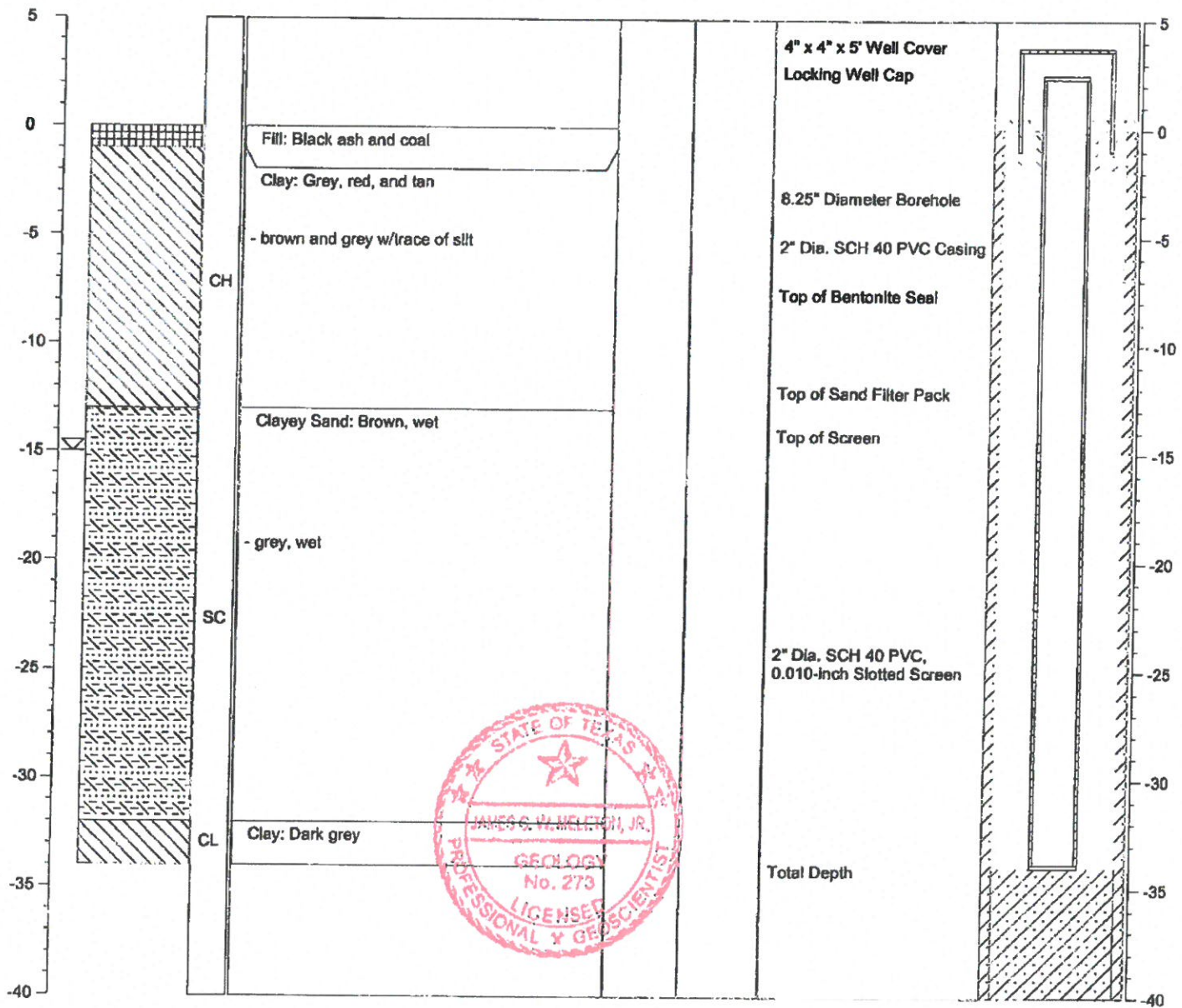
DRILLING CO.: **WEST Drilling**
 DRILLER: **Tom McCullough**
 METHOD OF DRILLING: **Hollow-stem Auger**
 SAMPLING METHODS: **Split-spoon**
 DATE DRILLED: **12/1/09**

NOTES: **Latitude: 33.05455**
Longitude: 94.84674

≡ Water level during drilling
 ≡ Water level in completed well

Page 1 of 1

DEPTH	SOIL SYMBOLS	USCS	SOIL DESCRIPTION	CORE RECOVERY (Percent)	PID (ppm)	WELL DESCRIPTION	WELL CONSTRUCTION
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**ETTL
ENGINEERS &
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MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(903) 595-4421

LOG OF BORING B-1

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

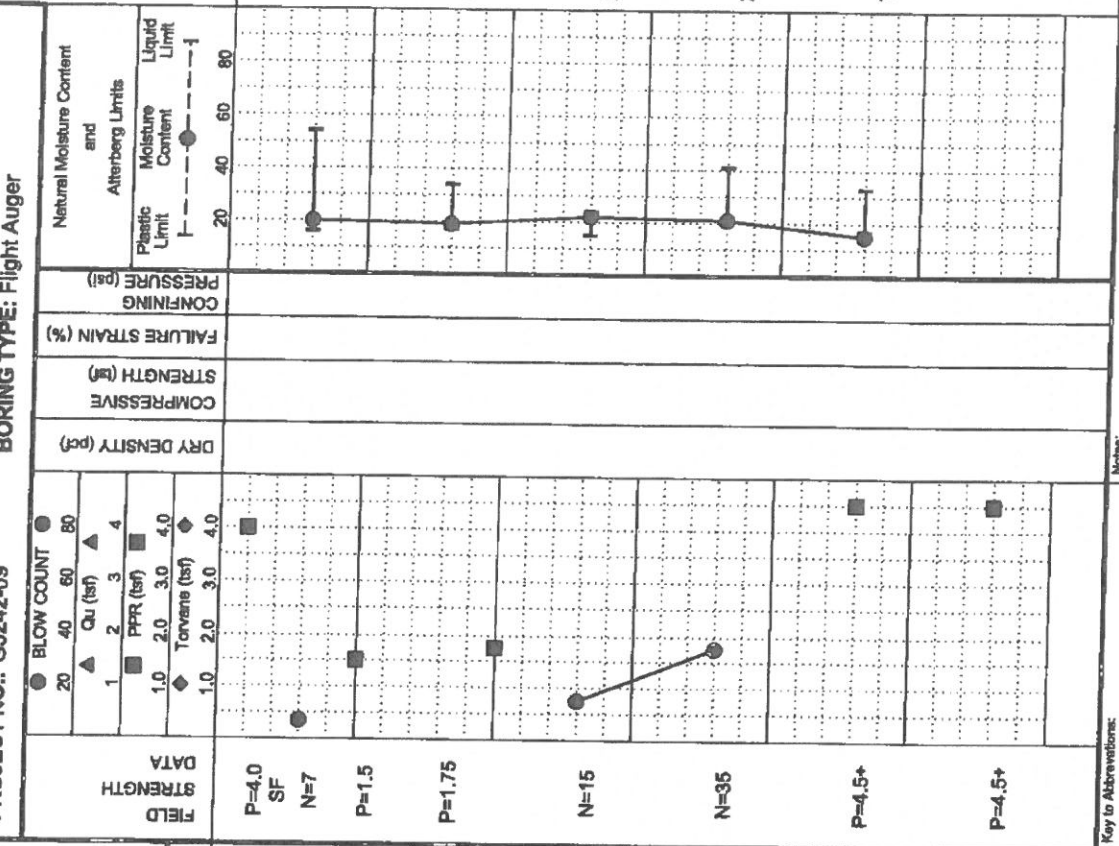
BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
324.1

MATERIAL DESCRIPTION	FIELD STRENGTH	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
						Moisture Content (%)	Plastic Limit (%)	Liquid Limit (%)	LIQUID LIMIT	PLASTIC LIMIT		
SANDY LEAN CLAY (CL) very stiff; brownish orange	P=4.0 SF	1.5				20	38	54	16	38	63	+40 Sieve=10% +4 Sieve=1%
SILTY SAND (SM) tannish orange	N=7											
SANDY FAT CLAY (CH) medium stiff; tannish orange	P=1.5											
CLAYEY SAND (SC) medium dense; tannish orange; with clay seams	P=1.75											
SANDY LEAN CLAY (CL) stiff; orange	N=15											
CLAYEY SAND (SC) medium dense; orange; saturated; with iron oxide cemented sandstone rock	N=35											
LEAN CLAY WITH SAND (CL) hard; dark gray; with clay seams	P=4.5+											
SANDY LEAN CLAY (CL) hard; dark brown	P=4.5+											
-grayish brown; laminated with silt												
Bottom of Boring @ 30'												



DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL
0		CL		
5		SM CH		
10		SC		
15		SC		
20		CL		
25		CL		
30				

Water Level Est.: Measured: Perched:
 Water Observations: Seepage @ 5' while drilling. Water level @ 4' and open to 30' upon completion.

Key to Abbreviations:
 N - SPT Data (Blows/ft)
 P - Pocket Penetrometer (ksf)
 T - Torvane (ksf)
 L - Lab Vane Shear (ksf)

Notes:
 GPS Coordinates: N 33°03.080', W 94°50.417'

Piezo B-2

LOG OF BORING B-2

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

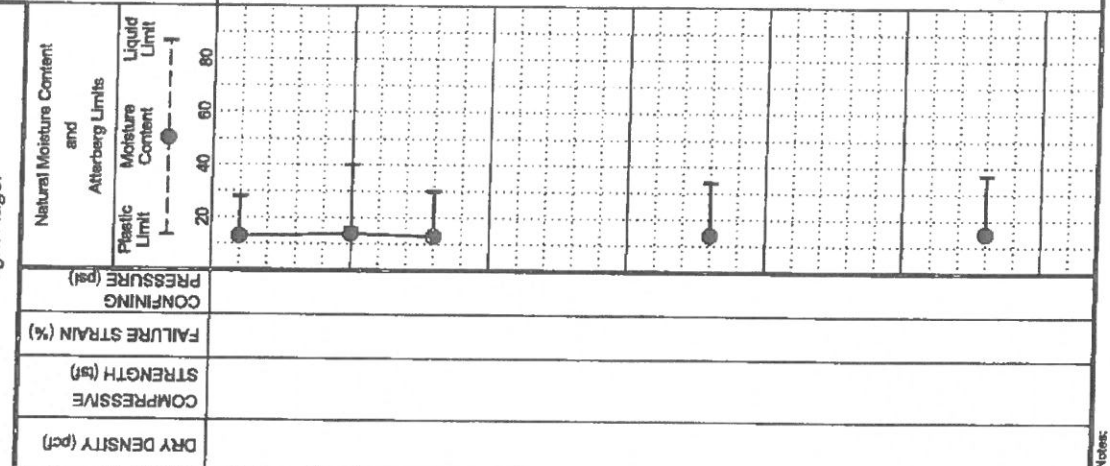
BORING TYPE: Flight Auger

DATE: 10/28/09

SURFACE ELEVATION
339.7

(Page Ref. #)
OTHER TESTS
PERFORMED

MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)
	LIQUID LIMIT	PLASTIC LIMIT	PL	
13	28	14	14	61
14	40	16	24	85
13	30	14	16	58
14	34	15	19	54
15	37	16	21	47



FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits	
					Plastic Limit	Liquid Limit
P=4.5+	1.0				14	28
P=3.5	1.0				16	40
N=14	1.0				14	30
P=2.75	1.0				15	34
P=4.5+	1.0				16	37
P=3.5	1.0				14	30
P=4.0	1.0				15	34
P=4.5	1.0				16	37

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH DATA	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits
0											
5		CL			SANDY LEAN CLAY (CL) hard; red and tan -very stiff -stiff -very stiff; reddish brown	P=4.5+ P=3.5 N=14 P=2.75	1.0				14 16 14 15
15		CL			SANDY LEAN CLAY (CL) hard; red and tan	P=4.5+	1.0				16 37
20					-very stiff	P=3.5	1.0				30
25						P=4.0	1.0				34
30		SC			CLAYEY SAND (SC) medium dense; tan, red, and gray	P=4.5	1.0				37

ETTL ENGINEERS & CONSULTANTS
MAIN OFFICE: 1717 East Erwin, Tyler, Texas 75702, (903) 596-4421

Water Level
Water Observations: completion.
Water level @ 19' and open to 24' upon completion.

Key to Abbreviations:
N - SPT Data (Blows/ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N 33°03.078', W 94°50.449'



**ETTL
ENGINEERS &
CONSULTANTS**

MAIN OFFICE
1717 East Erwin
Tyler, Texas 75702
(903) 595-4421

LOG OF BORING B-2

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/28/09

SURFACE ELEVATION
339.7

DEPTH (ft)	USC	SAMPLER	MATERIAL DESCRIPTION	FIELD STRENGTH	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Atterberg Limits		MOISTURE CONTENT (%)	OTHER TESTS PERFORMED (Page Ref. #)
										Plastic Limit	Liquid Limit		
35			-red and tan	P=2.5									
40	SM SC		SILTY CLAYEY SAND(SM-SC) red, tan, and gray; saturated	SF									
45	CH		EAT CLAY(CH) hard; brown, tan, and gray; with ferric joints; with lignite and sand seams	P=4.5+									
50	SM		SILTY SAND(SM) black and gray	SF									
			Bottom of Boring @ 50'										

ATTERBERG LIMITS(%)		MOISTURE CONTENT (%)	OTHER TESTS PERFORMED (Page Ref. #)
LIQUID LIMIT	PLASTIC LIMIT		
22	15	12	+40 Sieve=0% +4 Sieve=0%
MINUS #200 SIEVE (%)			
PLASTICITY INDEX			

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N 33°03.078', W 94°50.449'

Water Level: Measured: Perched:
Water level @ 19' and open to 24' upon completion.

Piezometer B-2

ENVIRONMENTAL LOG			Well No. B-2
Client: Welsh Power Plant			Location Pittsburg, Texas
Project No: G3242-095	Phase	Task	Surface Elev. _____

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0	Ground Surface				0	T.O.C. Elev.
5	<u>SANDY LEAN CLAY(CL)</u> hard; red and tan -very stiff		[Hatched Pattern]	[Well Construction Diagram]	5	
10	-stiff -very stiff; reddish brown				10	
15	<u>SANDY LEAN CLAY(CL)</u> hard; red and tan				15	
20	-very stiff				20	
25					25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>2-8' & 20-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>8-20'</u>
Drilling Started <u>10/28/09</u>	Well Casing <u>2.0" Dia. 0.0' to 10.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/28/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 10.0' to 20.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	_____
Type of Well _____	Slot Size <u>0.010"</u>	_____
	Grout Type <u>Bentonite</u>	_____

ENVIRONMENTAL LOG

Client: Welsh Power Plant

Project No: G3242-095



















Phase

Task

Well No. B-2

Location Pittsburg, Texas

Surface Elev.

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
Continued from previous page						
30	CLAYEY SAND(SC) medium dense; tan, red, and gray				30	
	-red and tan					
35					35	
	SILTY CLAYEY SAND(SM-SC) red, tan, and gray; saturated					
40					40	
	FAT CLAY(CH) hard; brown, tan, and gray; with ferric joints; with lignite and sand seams					
45					45	
	SILTY SAND(SM) black and gray					
50	Bottom of Boring @ 50'				50	
55						
60						





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MATERIAL DESCRIPTION

CLAYEY SAND(SC) medium dense; gray and red

FAT CLAY(CH) stiff; red and tan; with sand seams

-very stiff

FAT CLAY WITH SAND(CH) very stiff; brown; with ferric joints

-red and tan; layered; with ferric seams

FAT CLAY(CH) hard; gray; with sand seams

CLAYEY SAND(SC) very dense; gray; with sand seams

LOG OF BORING B-3

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
339.6

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT ● 20 40 60 80 ▲ Ou (tsf) ▲ 1 2 3 4 ■ PPR (tsf) ■ 1.0 2.0 3.0 4.0 ◆ Torvane (tsf) ◆ 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIONIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
											Plastic Limit	Liquid Limit		PL	TL	LI		
0											23	52	18	34	87	+40 Sieve=3%, +4 Sieve=0%		
5					N=11						21	51	19	32	86	+40 Sieve=3%, +4 Sieve=0%		
10					P=1.0						21	54	20	34	85	+40 Sieve=10%, +4 Sieve=1%		
15					P=3.5						23	61	24	37	81	+40 Sieve=11%, +4 Sieve=0%		
20					P=3.75						22	42	22	20	35	+40 Sieve=1%, +4 Sieve=0%		
25					P=2.5													
30					P=4.5+													
35					N=56													

Notes:
GPS Coordinates: N 33°02.998', W 94°50.514'

Key to Abbreviations:
N - SPT Data (Blow/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Est.: Measured: Punched:
Water Observations: Seepage @ 13' while drilling. Water level @ 19' and open to 24' upon completion.



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LOG OF BORING B-3

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
339.6

DEPTH (ft)	USC	SAMPLER	FIELD STRENGTH	DATA				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Atterberg Limits			MOISTURE CONTENT (%)	OTHER TESTS PERFORMED (Page Ref. #)		
				BLOW COUNT	Cu (tsf)	PPR (tsf)	Tonvane (tsf)					Plastic Limit	Moisture Content	Liquid Limit				
35	CH		P=4.5+	1	2.0	3.0	4.0					20	21	60	24	36	95	+40 Sieve=1%, +4 Sieve=0%
40			P=4.5+															
45	CL		P=3.5															
50	CH		P=4.5+															

DEPTH (ft)	USC	WATER LEVEL	WATER LEVEL	WATER LEVEL	WATER LEVEL
35	CH				
40					
45	CL				
50	CH				

MATERIAL DESCRIPTION

FAT CLAY(CH) hard; brown; layered and with sand seams

-gray and green

SANDY LEAN CLAY(CL) very stiff; gray and dark green; layered; with sand seams

FAT CLAY(CH) hard; gray and dark green; layered; with silt seams

Bottom of Boring @ 50'

Key to Abbreviations:
N - SPT Data (Blows/ft)
P - Pocket Penetrometer (tsf)
T - Tonvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N 33°02.998', W 94°50.514'

Pipe 200 for B-4

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LOG OF BORING B-4

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09
SURFACE ELEVATION
340.6

DEPTH (ft)	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSION STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits	MOISTURE CONTENT (%)			ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)
											Moisture Content	Liquid Limit	Plastic Limit	LIQUID LIMIT	PLASTIC LIMIT	PLASTICITY INDEX	
0	SM			N=19	20					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
5	CL	SANDY LEAN CLAY (CL) dark brown -tannish orange -hard; orangish tan		SF	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
10				P=3.25	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
15	SC	CLAYEY SAND (SC) medium dense; tan -orangish gray; with sand seams		P=3.25	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
20	CL	SANDY LEAN CLAY (CL) stiff; orangish tan		N=9	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
25	CH	EAT CLAY (CH) very stiff; orangish tan; with ferric seams -tannish brown; with iron ore seams		P=4.0	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		
30				P=2.75	3					20	24	15	9	59	+40 Sieve=1%, +4 Sieve=0%		

Other tests performed: (Page Ref. #)

Moisture Content (%)

Atterberg Limits (%)

Field Strength Data

Blow Count

Dry Density (pcf)

Compression Strength (tsf)

Failure Strain (%)

Confining Pressure (psi)

Natural Moisture Content and Atterberg Limits

Other Tests Performed

Water Level

Water Observations: completion.

Err: Measured: Fanned:

Water level @ 18' and open to 48' upon completion.

GPS Coordinates: N 33°03.011', W 94°50.462'

Notes:

N - SPT Data (Blow/Ft)

P - Proctor Parameters (tsf)

T - Tonnage (tsf)

L - Lab Vane Shear (tsf)

Key to Abbreviations:



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LOG OF BORING B-4

PROJECT: Walsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
340.6

DEPTH (ft)	SAMPLES	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSION STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		ATTERBERG LIMITS (%)				OTHER TESTS PERFORMED (Page Ref. #)
										Moisture Content	Plastic Limit	Liquid Limit	PL	PL	PL	
35		USC		N=30	1, 2, 3, 4											
40		CL		N=60/5.75*	1.0, 2.0, 3.0, 4.0											
45				N=41	1.0, 2.0, 3.0, 4.0											
50				N=43	1.0, 2.0, 3.0, 4.0											

MATERIAL DESCRIPTION

-hard; light gray, layered and with silt seams

LEAN CLAY (CL) hard; light gray, layered and with silt seams

-light gray

-layered and with sand seams; with lignite

Bottom of Boring @ 50'

Key to Abbreviations:
N - SPT Data (Blows/F)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:


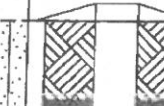
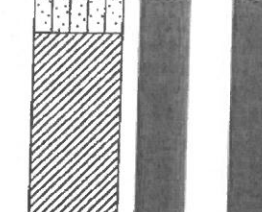
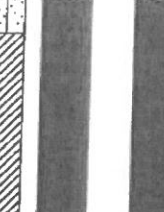
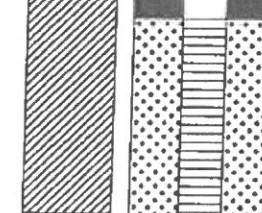
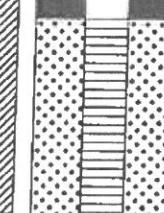
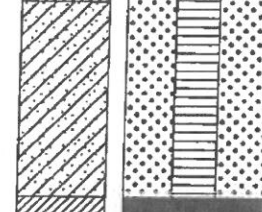
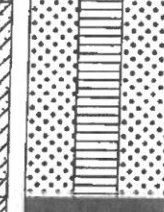
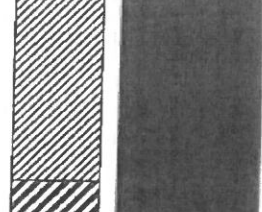
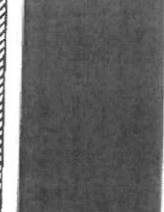
GPS Coordinates: N 33°03.011', W 94°50.462'

Water Level
Water Observations:
completion.

Ent.: Measured: Punched: Water level @ 18' and open to 48' upon completion.

Piezometer B-4

ENVIRONMENTAL LOG
 Client: Welsh Power Plant
 Project No: G3242-095 Phase Task Well No. B-4
 Location Pittsburg, Texas
 Surface Elev. Page 1 of 2

Depth Feet	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0	Ground Surface				0	T.O.C. Elev.
	SILTY SAND(SM) medium dense; tan; with gravel					
5	SANDY LEAN CLAY(CL) dark brown -tannish orange -hard; orangish tan				5	
10	-very stiff; white				10	
	CLAYEY SAND(SC) medium dense; tan -orangish gray; with sand seams				15	
15					15	
	SANDY LEAN CLAY(CL) stiff; orangish tan				20	
20					20	
	FAT CLAY(CH) very stiff; orangish tan; with ferric seams				25	
25					25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>2-8' & 18-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>6-18'</u>
Drilling Started <u>10/27/09</u>	Well Casing <u>2.0" Dia. 0.0' to 8.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/27/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 8.0' to 18.0'</u>	Notes: _____ _____ _____
Development Completed _____	Screen Type <u>Slotted</u>	
Type of Well _____	Slot Size <u>0.010"</u>	
	Grout Type <u>Bentonite</u>	

ENVIRONMENTAL LOG			Well No. B-4		
Client: Welsh Power Plant			Location Pittsburg, Texas		
Project No: G3242-095		Phase	Task	Surface Elev.	
Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet Well Construction Details
Continued from previous page					
30	-tannish brown; with iron ore seams				30
35	-hard; light gray; layered and with silt seams				35
40	<u>LEAN CLAY (CL)</u> hard; light gray; layered and with silt seams				40
45	-light gray				45
50	-layered and with sand seams; with lignite				50
Bottom of Boring @ 50'					
55					
60					



P.C. Zander B-5



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LOG OF BORING B-5

PROJECT: Welsh Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE

10/27/09

SURFACE ELEVATION
340.0

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION	FIELD STRENGTH	BLOW COUNT				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref, #)
							1	2	3	4					PL	LI				
0																				
2.0		CL			LEAN CLAY WITH SAND(CL) stiff, red and tan	P=2.0	2	2	3	4	1.8				22	47	19	28	81	+40 Sieve=9%, +4 Sieve=3%
4.0		CL			LEAN CLAY(CL) hard; red and tan -very stiff	P=4.5+	2	2	3	4	2.5				21	46	18	28	94	+40 Sieve=3%, +4 Sieve=0%
6.0		CH			FAT CLAY(CL) very stiff; brown and tan	P=3.0	2	2	3	4	2.5				22	52	24	28	88	+40 Sieve=3%, +4 Sieve=0%
8.0		CH			FAT CLAY WITH SAND(CH) hard; red and tan	P=4.5+	2	2	3	4	2.5				22	52	24	28	88	+40 Sieve=3%, +4 Sieve=0%
10.0		CL			SANDY LEAN CLAY(CL) very stiff; red and gray; with sand seams	P=3.0	2	2	3	4	2.5				19	33	17	16	44	+40 Sieve=1%, +4 Sieve=0%
12.0		SC			CLAYEY SAND(SC) very loose; tan, red, and gray	P=0.5	2	2	3	4	2.5				25	61	19	42	83	+40 Sieve=5%, +4 Sieve=3%
14.0		CH			FAT CLAY WITH SAND(CH) stiff; red and gray	P=2.0	2	2	3	4	2.5				25	61	19	42	83	+40 Sieve=5%, +4 Sieve=3%

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (ksf)
T - Terrene (ksf)
L - Lab Vane Shear (ksf)

Notes:
GPS Coordinates: N 33°02.964', W 94°50.428'

Water Level: Measured: Perched:
Water Observations: Seepage @ 35' while drilling. Water level @ 31' and open to 35' upon completion and after 30 minutes.



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MATERIAL DESCRIPTION

SILTY CLAYEY SAND(SC) gray and red;
saturated

FAT CLAY(CH) hard; red and gray; with sand
seams

-gray, tan, and red; with sand seams

SILTY SAND(SM-SC) red and gray

Bottom of Boring @ 50'

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL
35		SC		
40		CH		
45				
50		SM SC		

LOG OF BORING B-5

PROJECT: Welch Power Plant
Pittsburgh, Texas

PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09

SURFACE ELEVATION
340.0

FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ 1 2 3 4 ■ PPR (tsf) ■ ◆ Torvane (tsf) ◆ 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits			OTHER TESTS PERFORMED (Page Ref. #)		
						Plastic Limit	Moisture Content	Liquid Limit			
SF						25	51	31	20	87	+40 Sieve=6%, +4 Sieve=0%
P=4.5+											
P=4.5+											
SF											




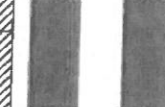



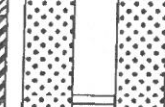

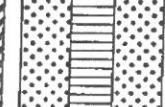

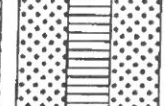

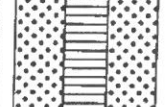

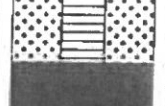
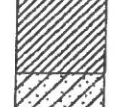

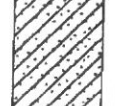

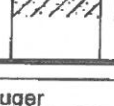

Key to Abbreviations:
N - SPT Data (Blow/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N 33°02.964', W 94°50.428'

Water Level: Measured: Perched:
Water Observations:
Seepage @ 35' while drilling. Water level @ 31' and open to 35' upon completion and after 30 minutes.

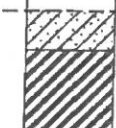

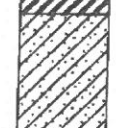





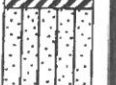

Appendix B-5

ENVIRONMENTAL LOG			Well No. <u>B-5</u>	Page 1 of 2
Client: <u>Welsh Power Plant</u>		Location <u>Pittsburg, Texas</u>	Surface Elev. _____	
Project No: <u>G3242-095</u>	Phase _____	Task _____		

Depth Feet	Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
0		Ground Surface				0	T.O.C. Elev.
		LEAN CLAY WITH SAND(CL) stiff; red and tan					
		LEAN CLAY(CL) hard; red and tan					
5		-very stiff				5	
		FAT CLAY(CL) very stiff; brown and tan					
10						10	
		FAT CLAY WITH SAND(CH) hard; red and tan					
15						15	
		SANDY LEAN CLAY(CL) very stiff; red and gray; with sand seams					
20						20	
		CLAYEY SAND(SC) very loose; tan, red, and gray					
25						25	

Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>2-5' & 20-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>5-20'</u>
Drilling Started <u>10/27/09</u>	Well Casing <u>2.0" Dia. 0.0' to 10.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/27/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 10.0' to 20.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	_____
Type of Well _____	Slot Size <u>0.010"</u>	_____
	Grout Type <u>Bentonite</u>	_____

ENVIRONMENTAL LOG			Well No. B-5			
Client: Welsh Power Plant			Location Pittsburg, Texas			
Project No: G3242-095			Surface Elev.			
Phase			Task			
Page 2 of 2						
Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
Continued from previous page						
30	FAT CLAY WITH SAND(CH) stiff; red and gray				30	
35	SILTY CLAYEY SAND(SC) gray and red; saturated				35	
40	FAT CLAY(CH) hard; red and gray; with sand seams				40	
45	-gray, tan, and red; with sand seams				45	
50	SILTY SAND(SM-SC) red and gray				50	
	Bottom of Boring @ 50'					
55						
60						

Pit 2010 B-6



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MATERIAL DESCRIPTION

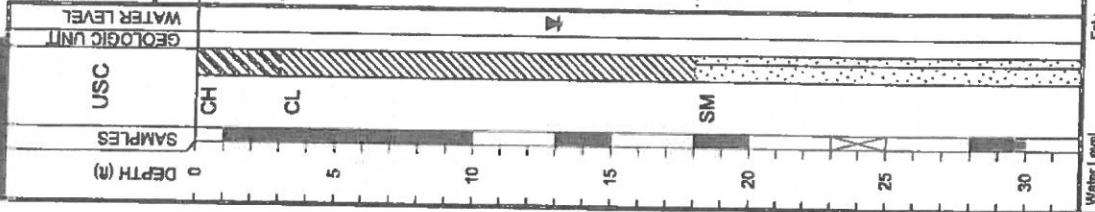
FAT CLAY (CH) very stiff; red and gray; with
ferric seams

SANDY LEAN CLAY (CL) hard; red and tan

-very stiff; red, gray, and brown; with gravel
-with sand seams

SILTY SAND (SM) gray; saturated

-very dense; gray and red



LOG OF BORING B-6

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09

SURFACE ELEVATION
340.1

FIELD STRENGTH	DATA	BLOW COUNT		DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
		1	2					Plastic Limit	Liquid Limit		LL	PL	PI		
P=4.0		1	2	1.0				20	32	12	32	14	18	60	+40 Sieve=0%, +4 Sieve=0%
P=4.5+		1	2	1.0				20	49	21	49	20	29	93	+40 Sieve=2%, +4 Sieve=0%
P=3.0		1	2	1.0				20	49	14	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%
P=3.0		1	2	1.0				20	49	14	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%
P=4.0		1	2	1.0				20	49	14	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%
P=3.0		1	2	1.0				20	49	14	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%
N=50/5.25*		1	2	1.0				20	49	20	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%
SF		1	2	1.0				20	49	20	49	18	31	65	+40 Sieve=0%, +4 Sieve=0%

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Note:
GPS Coordinates: N 33°02.912', W 94°50.462'

Water Level: Est. Measured: Perched:
Water Observations:
Seepage @ 17' while drilling. Water level @ 13' and open to 15' upon completion and after 30 minutes.



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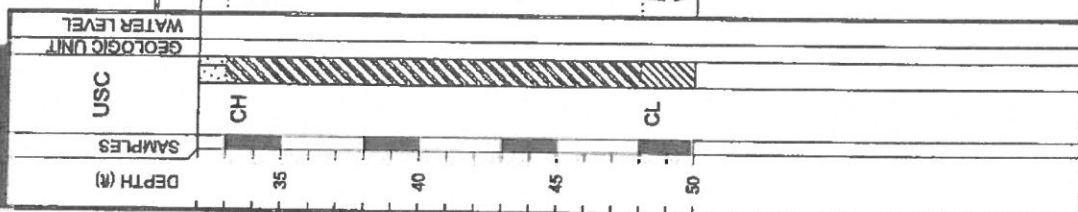
MATERIAL DESCRIPTION

FAT CLAY (CH) hard; brown; with sand seams

-dark green

LEAN CLAY (CL) hard; dark green; laminated with lignite

Bottom of Boring @ 50'



Water Level: Measured: Perched:
 Water Observations:
 @ 13' and open to 15' upon completion and after 30 minutes.
 Seepage @ 17' while drilling. Water level

LOG OF BORING B-6

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09
SURFACE ELEVATION: 340.1

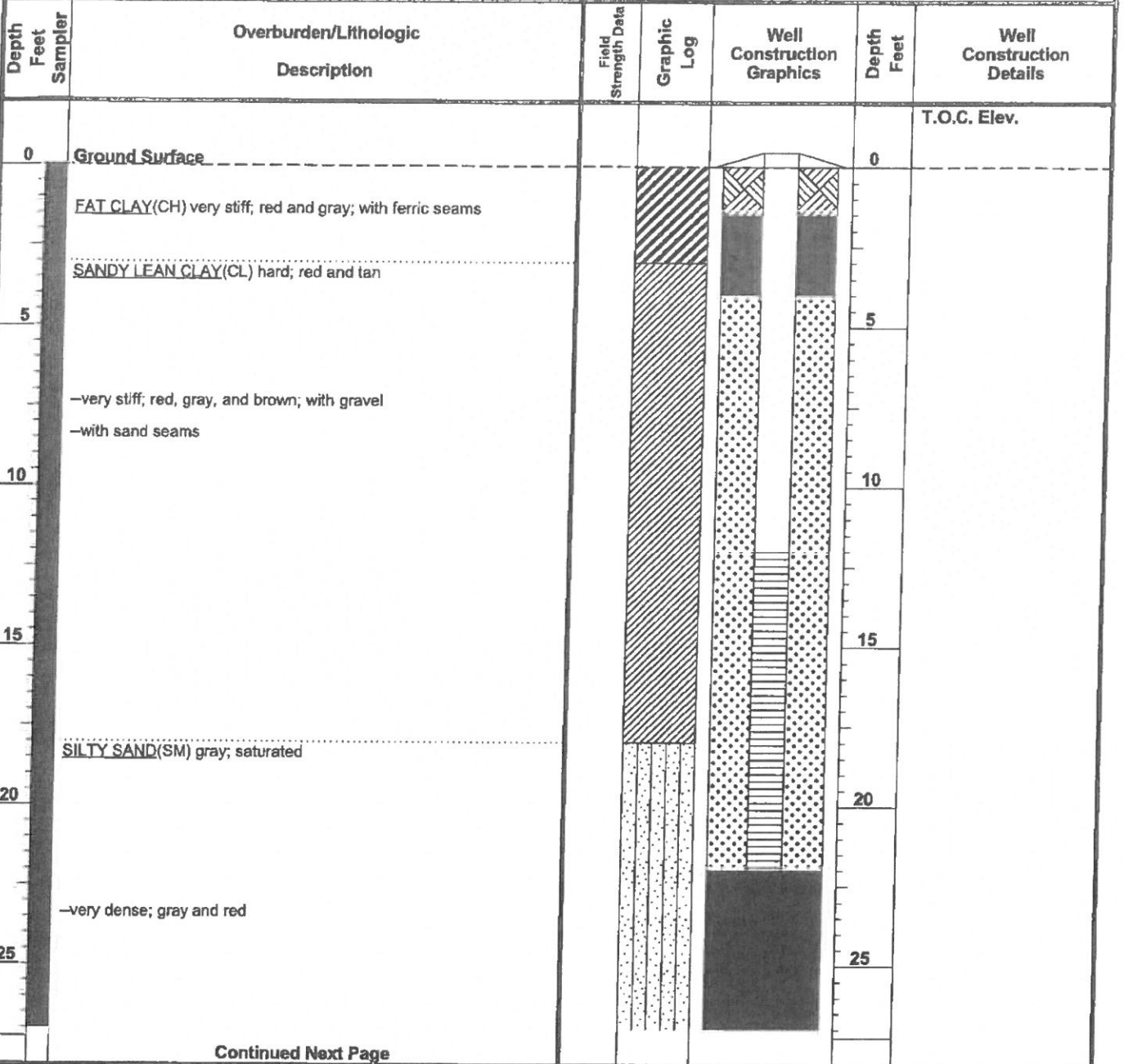
FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ 1 2 3 4 ■ PPR (tsf) ■ 1.0 2.0 3.0 4.0 ◆ Torvane (tsf) ◆ 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%) LIQUID LIMIT (LL) PLASTIC LIMIT (PL) PLASTICITY INDEX (PI)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
						Plastic Limit	Liquid Limit				
P=4.5+						22	68	24	44	95	+40 Sieve=0%, +4 Sieve=0%
P=4.5+											
P=4.5+											
P=4.5+											

Notes:
GPS Coordinates: N 33°02.912', W 94°50.462'

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Pipe Pile B-6

ENVIRONMENTAL LOG			Well No. B-6
Client: Welsh Power Plant		Location Pittsburg, Texas	
Project No: G3242-095	Phase	Task	Surface Elev. Page 1 of 2



Continued Next Page

Driller <u>Doug Hinds</u>	Drilling Method <u>Solid Stem Auger</u>	Bentonite Seal <u>1.5-4' & 22-50'</u>
Logged By <u>James Griffith</u>	Borehole Diameter <u>6.5"</u>	Filter Pack Qty. <u>4-22'</u>
Drilling Started <u>10/28/09</u>	Well Casing <u>2.0" Dia. 0.0' to 12.0'</u>	Filter Pack Type <u>20/40 Sand</u>
Drilling Completed <u>10/28/09</u>	Casing Type <u>PVC</u>	Static Water Level _____
Construction Completed _____	Well Screen <u>2.0" Dia. 12.0' to 22.0'</u>	Notes: _____
Development Completed _____	Screen Type <u>Slotted</u>	
Type of Well _____	Slot Size <u>0.010"</u>	
	Grout Type <u>Bentonite</u>	

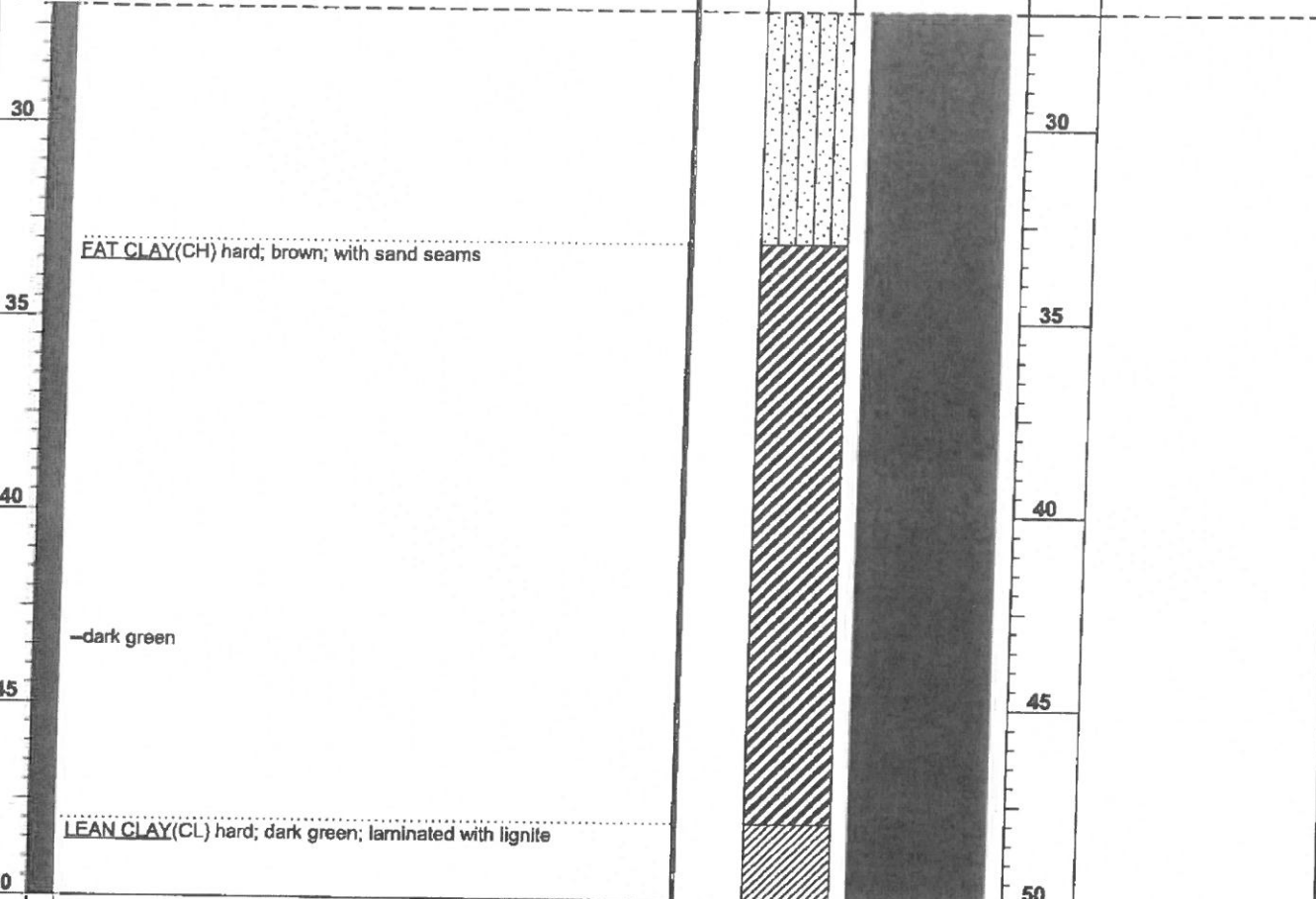


ENVIRONMENTAL LOG
 Client: Welsh Power Plant
 Project No: G3242-095

Well No. B-6
 Location Pittsburg, Texas
 Surface Elev. _____
 Page 2 of 2

Depth Feet Sampler	Overburden/Lithologic Description	Field Strength Data	Graphic Log	Well Construction Graphics	Depth Feet	Well Construction Details
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Continued from previous page



Bottom of Boring @ 50'





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MATERIAL DESCRIPTION

SM
SILTY SAND(SM) dense; tan

-gray; saturated

-very dense

CH
EAT CLAY(CH) very stiff; dark gray; with silt and ferric seams

-hard; gray and black; with trace of lignite

-gray

Bottom of Boring @ 30'

DEPTH (ft)	0	5	10	15	20	25	30
SAMPLES							
USC							
GEOLOGIC UNIT							
WATER LEVEL							

Water Level

Est. Measured: Perched:

Water Observations:
Seepage @ 4' while drilling. Water level @ 2' and open to 7' upon completion.

LOG OF BORING B-7

PROJECT: Welsh Power Plant
Pittsburgh, Texas
PROJECT NO.: G3242-09

BORING TYPE: Flight Auger

DATE: 10/27/09
SURFACE ELEVATION: 340.4

FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (ksf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psf)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			OTHER TESTS PERFORMED (Page Ref. #)	
						Plastic Limit	Liquid Limit		L	PL	U		
N=31	1.0	1.0	1.0			20	20	21				+40 Sieve=0%, +4 Sieve=0%	
N=36	2.0	2.0	2.0			20	20	23				+40 Sieve=0%, +4 Sieve=0%	
N=38	3.0	3.0	3.0			20	20					+40 Sieve=0%, +4 Sieve=0%	
N=59	4.0	4.0	4.0			20	20					+40 Sieve=0%, +4 Sieve=0%	
N=26	1.0	1.0	1.0			20	20	14	58	22	36	98	+40 Sieve=0%, +4 Sieve=0%
P=4.5+													
P=4.5+													

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:
GPS Coordinates: N 33°02.898', W 94°50.519'

Landfill Boring B.2

LOG OF BORING B-2

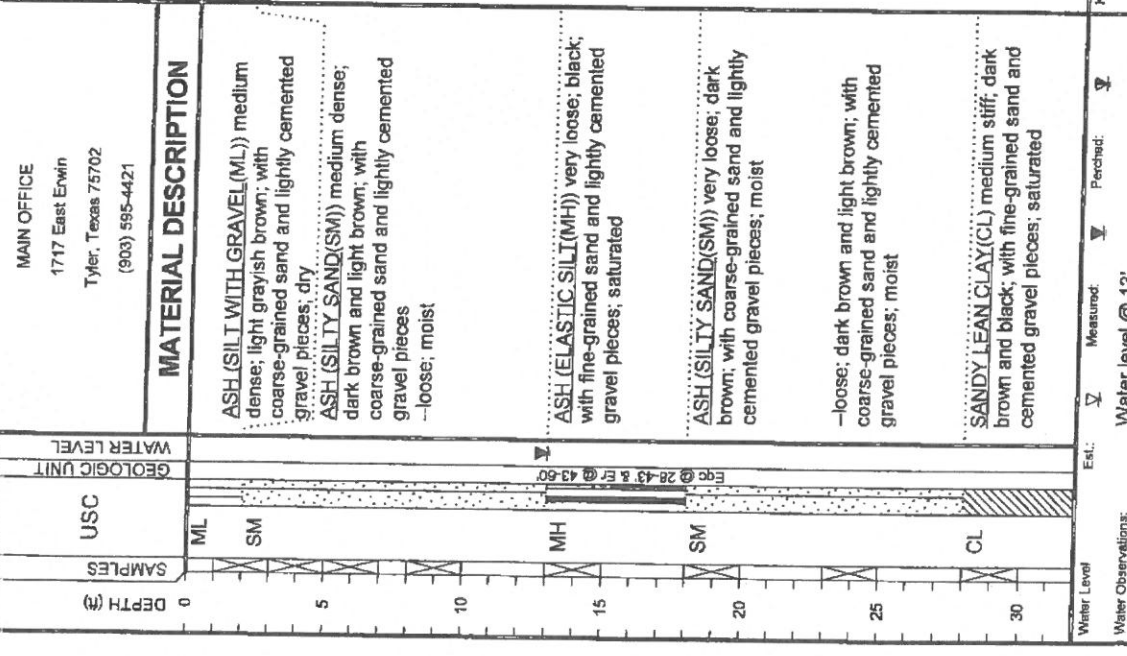
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PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
PROJECT NO.: G4207-146
DRILL RIG: B-61 HDX
BORING TYPE: Rotary Wash/Flight Auger

DATE: 10/8/14
SURFACE ELEVATION: 373.8

FIELD STRENGTH DATA	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS(%)			OTHER TESTS PERFORMED (Page Ref. #)
						Moisture Content	Liquid Limit		TI	PL	PI	
N=13	1	1.0	1.0	1.0	1.0	46	59				+40 Sieve=27% +4 Sieve=16%	
N=29	2	2.0	2.0	2.0	2.0	40	40				+40 Sieve=19% +4 Sieve=2%	
N=18	3	3.0	3.0	3.0	3.0	200	134	92	42	100	+40 Sieve=0% +4 Sieve=0%	
N=9	4	4.0	4.0	4.0	4.0	91	61				+40 Sieve=11% +4 Sieve=1%	
N=0						18	30	15	15	63	+40 Sieve=1% +4 Sieve=0%	
N=1												
N=7												
N=6												



MATERIAL DESCRIPTION

ASH (SILT WITH GRAVEL (ML)) medium dense; light grayish brown; with coarse-grained sand and lightly cemented gravel pieces; dry

ASH (SILTY SAND (SM)) medium dense; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces --loose; moist

ASH (ELASTIC SILT (MH)) very loose; black; with fine-grained sand and lightly cemented gravel pieces; saturated

ASH (SILTY SAND (SM)) very loose; dark brown; with coarse-grained sand and lightly cemented gravel pieces; moist

--loose; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces; moist

SANDY LEAN CLAY (CL) medium stiff; dark brown and black; with fine-grained sand and cemented gravel pieces; saturated

Water Level: Water level @ 13'

Est. Measured Perched

Key to Abbreviations:
N - SPT Data (Blows/Ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

Notes:

GPS Coordinates: N33.04890° W94.84451°

Driller: Tommy Cook
Logger: B. Hobbs/O. Sanderson



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LOG OF BORING B-2 (cont.)

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Weish Power Station - Cason, Texas
DRILL RIG: B-61 HDX
BORING TYPE: Rotary Wash/Flight Auger

PROJECT NO.: G4207-146

DATE

10/8/14

SURFACE ELEVATION
373.8

FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ 1 2 3 4 ■ PPR (tsf) ■ 1.0 2.0 3.0 4.0 ◆ Torvane (tsf) ◆	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS(%)			OTHER TESTS PERFORMED (Page Ref. #)
						Plastic Limit	Liquid Limit		LI	PL	PI	
P=3.5 P=2.75	■ 20 ■ 40 ■ 60 ■ 80	110	1.39	4.3	21	20	30	18	30	15	39	+40 Sieve=0% +4 Sieve=0%
N=78	◆ 1.0 ◆ 2.0 ◆ 3.0 ◆ 4.0					20	62	21	26	15	24	+40 Sieve=0% +4 Sieve=0%
N=27						20	62	25	26	36	96	+40 Sieve=2% +4 Sieve=0%
P=4.0		98				20	62	24	26	36	96	+40 Sieve=2% +4 Sieve=0%
N=37						20	62					

Notes:

Key to Abbreviations:
N - SFT Data (Blow/ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

GPS Coordinates:
N33.04890°, W94.84451°

Driller:
Tommy Cook

Logger:
B. Hobbs/O. Sanderson

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	MATERIAL DESCRIPTION
35		SC			CLAYEY SAND(SC) dense; light brown, light gray and reddish brown; moist; with fine-grained sand; mottled
40		SM			SILTY SAND(SM) very dense; light brown, yellowish brown and light gray; moist; mottled; with fine-grained sand
45		CH			EAT CLAY(CH) very stiff; dark brown and light brown; moist; with sand seams; laminated
50					--dark brown with light gray; moist; with silt seams
55					--hard; dark brown; moist
60					Bottom of Boring @ 60'

Water Level: Measured: Perched:
Water Observations: Water level @ 13'.

Water Level

Water Observations:

Landfill Boring B-10



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MATERIAL DESCRIPTION

ASH (CLAYEY SAND(SC)) loose; dark brown and light brown; with coarse-grained sand and lightly cemented gravel pieces; moist

ASH (ELASTIC SILT(MH)) very loose; black; moist

--wet

ASH (SILTY SAND WITH GRAVEL(SM)) very dense; light brown and dark brown; with lightly cemented gravel pieces and coarse-grained sand; moist; cemented layer from 17.5' to 21'

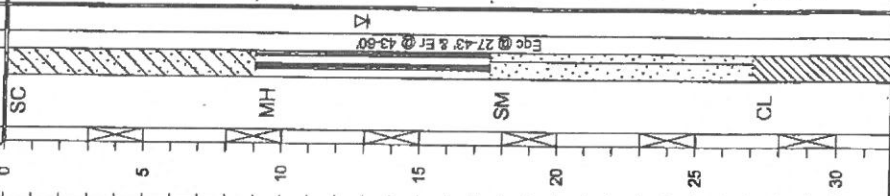
--cemented layer from 23' to 27'

SANDY LEAN CLAY(CL) medium stiff; grayish brown and yellowish brown; saturated; mottled

Est. Measured Perched

Seepage @ 13' while drilling.

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL
0				
5		SC		
10		MH		
15				
20		SM		
25				
30		CL		



Water Level

Water Observations:

LOG OF BORING B-10

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
PROJECT NO.: G4207-146
DRILL RIG: B-61 HDX
BORING TYPE: Rotary Wash/Flight Auger

FIELD DATA	BLOW COUNT				DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)	MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
	N	Qu (tsf)	PPR (tsf)	Torvane (tsf)					Plastic Limit	Liquid Limit				
N=7	1.0	2.0	3.0	4.0					24	31	19	12	41	+40 Sieve=21% +4 Sieve=11%
N=3	1.0	2.0	3.0	4.0										
N=0	1.0	2.0	3.0	4.0										
N=50/1"	1.0	2.0	3.0	4.0					56				14	+40 Sieve=71% +4 Sieve=28%
N=50/4"	1.0	2.0	3.0	4.0										
N=4	1.0	2.0	3.0	4.0					19	23	14	9	57	+40 Sieve=1% +4 Sieve=0%

Notes:

Key to Abbreviations:
N - SPT Data (Blows/ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

GIS Coordinates: N33.04895°, W94.84390°

Driller: Tommy Cook

Logger: B. Hobbs/O. Sanderson

DATE

10/8/14

SURFACE ELEVATION
373.2



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MATERIAL DESCRIPTION

CLAYEY SAND(SC) medium dense; reddish brown and grayish brown; moist; mottled

EAT CLAY(CH) very stiff; dark brown with light gray; with silt seams; moist

-hard

Bottom of Boring @ 60'

DEPTH (ft)	SAMPLES	GEOLOGIC UNIT	WATER LEVEL
35		USC	
40		SC	
45		CH	
50			
55			
60			

Eggs @ 27-43 & Er @ 43-60

Water Level
Water Observations:
Est.: Measured: Perched:

Seepage @ 13' white drilling.

LOG OF BORING B-10 (cont.)

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
Welsh Power Station - Cason, Texas
DRILL RIG: B-61 HDX
PROJECT NO.: G4207-146
BORING TYPE: Rotary Wash/Flight Auger

DATE: 10/8/14
SURFACE ELEVATION: 373.2

FIELD STRENGTH DATA	BLOW COUNT 20 40 60 80 ▲ Qu (tsf) ▲ 1 2 3 4 ■ PPR (tsf) ■ ◆ Torvane (tsf) ◆ 1.0 2.0 3.0 4.0	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits			MOISTURE CONTENT (%)	ATTERBERG LIMITS(%)			OTHER TESTS PERFORMED (Page Ref. #)	
						Plastic Limit	Moisture Content	Liquid Limit		LL	PL	IP		MINUS #200 SIEVE (%)
P=1.25 P=1.0		107	2.10	6.1	21	20	20	22	22	25	17	8	27	+40 Sieve=3% +4 Sieve=0%
N=23						20	20	22	22	25	17	8	27	+40 Sieve=7% +4 Sieve=0%
N=18						20	20	22	22	25	17	8	27	+40 Sieve=7% +4 Sieve=0%
P=4.5+						20	20	22	22	25	17	8	27	+40 Sieve=7% +4 Sieve=0%
P=4.5+						20	20	22	22	25	17	8	27	+40 Sieve=7% +4 Sieve=0%

Notes:

Key to Abbreviations:
N - SPT Data (Blows/ft)
P - Pocket Penetrometer (tsf)
T - Torvane (tsf)
L - Lab Vane Shear (tsf)

GPS Coordinates: N33.04895°, W94.84390°

Diller: Tommy Cook

Logger: B. Hobbs/O. Sanderson

Landfill Boring B-13

LOG OF BORING B-13

DATE		10/15/14	
SURFACE ELEVATION		361.4	
OTHER TESTS PERFORMED		(Page Ref. #)	
MOISTURE CONTENT (%)		20	
LIQUID LIMIT		45	
PLASTIC LIMIT		17	
PLASTICITY INDEX		28	
MINUS #200 SIEVE (%)		76	
+40 Sieve=1%		+40 Sieve=1%	
+4 Sieve=0%		+4 Sieve=0%	

PROJECT:	Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest Welsh Power Station - Cason, Texas
PROJECT NO.:	G4207-146
DRILL RIG:	
BORING TYPE:	Flight Auger
FIELD STRENGTH DATA	
BLOW COUNT	20 40 60 80
Qu (tsf)	▲ 1 2 3 4
PPR (tsf)	■ 1.0 2.0 3.0 4.0
Torsion (tsf)	◆ 1.0 2.0 3.0 4.0
DRY DENSITY (pcf)	
COMPRESSION STRENGTH (tsf)	
FAILURE STRAIN (%)	
CONFINING PRESSURE (psi)	
Natural Moisture Content and Atterberg Limits	
Plastic Limit	20 40 60 80
Moisture Content	
Liquid Limit	

DEPTH (ft)	0	5	10	15	20	25	30
SAMPLES							
USC	CL	CL	SC	CH	CL	ML	
GEOLOGIC UNIT							
WATER LEVEL							
MATERIAL DESCRIPTION	LEAN CLAY WITH SAND (CL) medium stiff; reddish brown with light gray; moist	SANDY LEAN CLAY (CL) very stiff; light brown, gray and reddish brown; moist; mottled	CLAYEY SAND (SC) medium dense; grayish brown; moist	EAT CLAY WITH SAND (CH) medium stiff; reddish brown and light gray; moist; mottled	LEAN CLAY (CL) very stiff; light gray and grayish brown; moist; layered with silt	SILT WITH SAND (ML) very dense; light gray and yellowish brown; wet; with clay seams	Bottom of Boring @ 30'
FIELD STRENGTH DATA	N=7	P=4,0	N=11	N=8	N=21	N=50/5"	
Notes:	Key to Abbreviations: N - SPT Data (Blows/Ft) P - Pocket Penetrometer (tsf) T - Torsion (tsf) L - Lab Vane Shear (tsf)						
Water Observations:	Water level @ 28' and open upon completion.						
Est:	Measured	Perched					
GPS Coordinates:	N33.047160°, W94.84384°						
Driller:	Lewis Drilling, Inc.						
Logger:	O. Sanderson						

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Landfill Boring B-14

LOG OF BORING B-14

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
 Weish Power Station - Cason, Texas
DRILL RIG: BORING TYPE: Flight Auger
PROJECT NO.: G4207-148

DATE: 10/14/14
SURFACE ELEVATION: 347.2
OTHER TESTS PERFORMED: (Page Ref. #)

DEPTH (ft)	SAMPLES	USC	GEOLOGIC UNIT	WATER LEVEL	FIELD STRENGTH DATA	TEST RESULTS				MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
						BLOW COUNT	FAILURE STRAIN (%)	COMPRESSION STRENGTH (tsf)	DRY DENSITY (pcf)		PLASTIC LIMIT	LIQUID LIMIT	PLASTICITY INDEX		
0															
5					N=9										
10					N=11					108	17	NP	68	+40 Sieve=1% +4 Sieve=1%	
15					P=4.0										
20					N=34						40	16	24	+40 Sieve=1% +4 Sieve=0%	
25					N=27										
30					N=26					26			10	+40 Sieve=0% +4 Sieve=0%	
30										25					

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 MAIN OFFICE: 1717 East Erwin, Tyler, Texas 75702, (903) 585-4421

MATERIAL DESCRIPTION

- SANDY LEAN CLAY (CL) medium stiff; yellowish brown with reddish brown; dry; with clay seams
- SANDY SILT (ML) medium dense; grayish brown; moist; with clay seams
- SANDY LEAN CLAY (CL) very stiff; light gray and gray; moist
- light gray and grayish brown; moist; layered with silt
- POORLY GRADED SAND WITH SILT (SP-SM) medium dense; yellowish brown; light gray and reddish brown; wet
- LEAN CLAY (CL) very stiff; dark brown; moist; with silt partings
- Bottom of Boring @ 30'

Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Pocket Penetrometer (tsf)
 T - Torvane (tsf)
 L - Lab Vane Shear (tsf)

Notes:

Water level @ 17' and caved to 23' upon completion.

Est.: Measured: Perched:
 Water level @ 17' and caved to 23' upon completion.

GPS Coordinates: N33.04774°, W94.84290°
Driller: Lewis Drilling, Inc.
Logger: O. Sanderson

Landfill Boring B-15

ETTL ENGINEERS & CONSULTANTS
 MAIN OFFICE
 1717 East Erwin
 Tyler, Texas 75702
 (903) 595-4421

PROJECT: Phase 1 Fly Ash Storage Area Embankment Seepage & Vertical Expansion Invest.
 Welsh Power Station - Cason, Texas
DRILL RIG: BORING TYPE: Flight Auger

PROJECT NO.: G4207-146

DATE: 10/14/14
SURFACE ELEVATION: 348.2

OTHER TESTS PERFORMED: (Page Ref. #)

DEPTH (ft)	FIELD STRENGTH	BLOW COUNT	DRY DENSITY (pcf)	COMPRESSIVE STRENGTH (tsf)	FAILURE STRAIN (%)	CONFINING PRESSURE (psi)	Natural Moisture Content and Atterberg Limits		MOISTURE CONTENT (%)	ATTERBERG LIMITS (%)			MINUS #200 SIEVE (%)	OTHER TESTS PERFORMED (Page Ref. #)
							Plastic Limit	Liquid Limit		PL	PL	LI		
0														
10	N=10	1					24	59	21	38	85		+40 Sieve=0% +4 Sieve=0%	
15	P=3.75													
21	N=21													
25	N=56													+40 Sieve=0% +4 Sieve=0%
30	P=4.5						25	45	22	23	92		+40 Sieve=0% +4 Sieve=0%	

MATERIAL DESCRIPTION

0 - 5' **CH** FAT CLAY (CH) stiff; reddish brown and light gray; moist; mottled

5 - 10' **SM** --very stiff; light gray, grayish brown and reddish brown; moist; layered

10 - 15' **SM** SILTY SAND (SM) very dense; light brown; dry

15 - 25' **CL** --medium dense; wet

25 - 30' **CL** --very dense

30' **CL** LEAN CLAY (CL) hard; dark brown; moist; with silt partings

Bottom of Boring @ 30'

USC WATER LEVEL

GEologic UNIT Eye @ 0-28' & Ft @ 29-30'

Water Level Measured: Perched:
 Water level @ 17' and caved to 19' upon completion.

Notes:
 Key to Abbreviations:
 N - SPT Data (Blows/Ft)
 P - Pocket Penetrometer (tsf)
 T - Torsion (tsf)
 L - Lab Vane Shear (tsf)

GPS Coordinates: N33.04857° W94.84286°
 Driller: Lewis Drilling, Inc. Logger: O. Sanderson



Appendix B

Photographic Log



PHOTOGRAPHIC LOG

Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
1

Date:
8/20/2015

Direction Photo Taken:
North

Description:
Staging area west of landfill.

P8200493



PHOTOGRAPHIC LOG

Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
2

Date:
8/20/2015

Direction Photo Taken:
South Southeast

Description:
Potential wetland on the top (west) end of the Primary Ash Pond.

P8200495



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
3

Date:
8/20/2015

Direction Photo Taken:
West Northwest

Description:
Ditch between road and railway west of landfill, this ditch would be non-jurisdictional.

P8200497



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
4

Date:
8/20/2015

Direction Photo Taken:
Northeast

Description:
Ground Water Monitoring Well AD-12 near northwest end of landfill.

P8200501



Project Name:

AEP – J. ROBERT WELSH POWER PLANT

Location:

PITTSBURG, TITUS COUNTY, TEXAS

Project No.

OK001625.0001

Photo No.

5

Date:

8/20/2015

Direction Photo Taken:

East Northeast

Description:

View of plant from top of landfill. Primary ash pond is within the wooded area on left.

P8200506


Project Name:

AEP – J. ROBERT WELSH POWER PLANT

Location:

PITTSBURG, TITUS COUNTY, TEXAS

Project No.

OK001625.0001

Photo No.

6

Date:

8/20/2015

Direction Photo Taken:

East Northeast

Description:

Drainage canal that drains from primary ash pond to clear water pond.

P8200510



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
7

Date:
8/20/2015

Direction Photo Taken:
West Northwest

Description:
Vegetated strip between landfill and road. This would be isolated due to lack of connectivity.

P8200521



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
8

Date:
8/20/2015

Direction Photo Taken:
North

Description:
Dike between landfill and primary ash pond. Facility in the background.

P8200522



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
9

Date:
8/20/2015

Direction Photo Taken:
West

Description:
Vegetated strip between landfill and road. This area would be isolated due to lack of connectivity.

P8200527



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
10

Date:
8/20/2015

Direction Photo Taken:
North Northeast

Description:
Road east of landfill running toward facility and clear water pond.

P8200530



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
11

Date:
8/20/2015

Direction Photo Taken:
South

Description:
Top of landfill.

P8200534



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
12

Date:
8/20/2015

Direction Photo Taken:
Southeast

Description:
View of lined bottom ash storage pond.

P8200538



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
13

Date:
8/20/2015

Direction Photo Taken:
Southeast

Description:
Lined bottom ash storage pond.

P8200545



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
14

Date:
8/20/2015

Direction Photo Taken:
South

Description:
Southside of lined bottom ash storage pond.

P8200547



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
15

Date:
8/20/2015

Direction Photo Taken:
West

Description:
East side of lined bottom ash storage pond.

P8200560



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
16

Date:
8/20/2015

Direction Photo Taken:
North

Description:
Upland with pine and ground water monitoring well AD-2 south of lined bottom ash storage pond.

P8200563



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
17

Date:
8/20/2015

Direction Photo Taken:

Description:

Outflow of water from plant into the northeast portion of the Primary Ash Pond.

P8200577



Project Name:
AEP – J. ROBERT WELSH POWER PLANT

Location:
PITTSBURG, TITUS COUNTY, TEXAS

Project No.
OK001625.0001

Photo No.
18

Date:
8/20/2015

Direction Photo Taken:

South Southwest

Description:

Northeast portion of primary ash pond, view facing south-southwest.

P8200578

